February 2014 Air Sampling Status Report

Site:

Former United Shoe Machinery Division North Parcel
181 Elliot Street, Beverly, MA

Prepared For:

Cummings Properties, LLC
200 West Cummings Park
Woburn, MA 01801

Prepared by:

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July 21, 2014

February 2014 Air Sampling Status Report for United Shoe Machinery Division North Parcel, Beverly, Massachusetts
Document Title

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July 21, 2014
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Printed Name/Date

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1.0 SITE BACKGROUND AND HISTORY

1.1 Site Background

The former United Shoe Machinery (USM) Division North Parcel consists of approximately 80 acres at 181 Elliott Street in Beverly, Massachusetts. A Locus Plan is shown as **Figure 1** and a Site Plan as **Figure 2**. The Cummings Center (Former USM Machinery Division North Parcel) constitutes only a portion of the entire property that was the Former USM Machinery Division. The "South Parcel" of the Former USM Machinery Division is located on the south side of Elliot Street (Route 62).

This site has been included in the U.S. EPA's RCRA 2020 Corrective Action Universe list. By the year 2020, EPA and the authorized states plan to have largely completed the work of implementing final remedies at all facilities requiring Corrective Action. This site is listed under the site number MAD 043415991 as USM Machinery Division. Massachusetts has not been given RCRA authorization for this site, therefore EPA is acting as the agency in charge for the RCRA program. As part of the RCRA 2020 program, EPA is overseeing an audit of the prior remedial actions. Despite that the site has undergone significant site assessment and remediation, the site is not listed as Remedy Construction in the RCRA 2020 database.

A Quality Assurance Project Plan (QAPP) and Sampling and Analysis Plan (SAP) dated July 30, 2012 was submitted and approved in 2012. This document included information on the proposed additional indoor air sampling activities to be implemented. Based upon review of the Site history and consideration of the current use of the Site, the primary question to be addressed by this investigation is whether potential volatile contaminant concentrations present a significant risk to the indoor air of the occupied buildings.

The Data Quality Objectives (DQO) for this investigation are designed to characterize the presence of volatile organic compounds in the indoor air in the occupied buildings and to determine if the presence of such compounds represents a significant risk to human health. Specific attention shall be given to the child, which represents the most sensitive receptor. Child day care and/or school uses currently occur in portions of Buildings 100, 500, and 600.

1.2 Site Indoor Air Sampling History

Previous investigations were conducted to assess indoor air quality in the buildings at the site. Such investigations involved the collection of soil gas data collected from soil borings installed underneath or adjacent to building footprints. In December 2004, soil gas probes were installed and soil gas samples were collected from around the exterior walls of Building 600 (see **Figure 2**). In February 2006, additional soil gas probes were installed and soil gas samples were collected from around the exterior walls of Building 600 and underneath the floor slab of Building 500 (see **Figure 2**). Soil gas samples were analyzed using the TO-15 method for

volatile compounds and the Massachusetts Air-Phase Petroleum Hydrocarbon (APH) method. The following compounds were detected during the 2004 and 2006 sampling events:

Acetone	Chloromethane	n-Hexane	Tetrachloroethylene
Benzene	Cyclohexane	2-Hexanone	Tetrahydrofuran
Bromodichloromethane	Dibromochloromethane	Isopropyl Alcohol	Toluene
1,3-Butadiene	1,1-Dichloroethane	Methylene Chloride	1,1,1-Trichloroethane
C_5-C_8 Aliphatics	Ethyl Acetate	Methyl Ethyl Ketone	Trichlorofluoromethane
C_9-C_{12} Aliphatics	Ethyl Alcohol	Methyl t-Butyl Ether	1,2,4-Trimethylbenzene
C_9-C_{10} Aromatics	Ethylbenzene	4-Methyl-2-Pentanone	1,3,5-Trimethylbenzene
Carbon Disulfide	4-Ethyl Toluene	Naphthalene	2,2,4-Trimethylpentane
Chloroform	Heptane	Propylene	Xylenes

Another investigation to address indoor air quality was performed in February 2008, when soil gas probes were installed around the exterior perimeter of Building 100. Soil gas samples were collected and analyzed using the TO-15 method for volatile compounds and the Massachusetts APH method. The following compounds were detected during the 2008 sampling event:

Acetone	1,1-Dichloroethane	n-Hexane	Tetrahydrofuran
C_5-C_8 Aliphatics	1,1-Dichloroethene	Isopropyl Alcohol	Toluene
C_9-C_{12} Aliphatics	Dichlorodifluoromethane	Methylene Chloride	1,1,1-Trichloroethane
Carbon Disulfide	Ethyl Alcohol	Methyl Ethyl Ketone	Trichloroethylene
Chloroethane	Heptane	Tetrachloroethylene	Trichlorofluoromethane
Chloroform			

Separate site-specific risk characterizations were performed using the 2004 and 2006 data for Buildings 500 and 600 and the 2008 data for Building 100. Risk characterizations were performed using the Method 3 protocols under the Massachusetts Contingency Plan. As actual indoor air data had not been collected at that time, applicable risk models were used to predict indoor air concentrations. These risk characterizations all concluded that there was no significant risk to human health (either to the child or adult) as a result of potential indoor air concentrations of volatile compounds based on the soil gas data.

The use of historical data as a baseline is appropriate as the purpose of this additional investigation is to determine if significant risk exists from compounds that may have been present during previous USM facility operations. The use of historic data would allow for the inclusion of degradation compounds of those volatile compounds previously detected as compounds of concern.

2.0 SUMMARY OF SAMPLING AND ANALYSIS PLAN AND PREVIOUS RISK CHARACTERIZATION

This Sampling and Analysis Plan was limited to the collection of air samples to establish conditions related to indoor air quality where children are present on the property for school or day care purposes. There are four locations on the property where such use is ongoing (see **Figure 3**):

- Bright Horizons Children's Center
  100 Cummings Center, S-149-J

- Futures Behavior Therapy Center
  100 Cummings Center, S-157-J

- New England Academy
  500 Cummings Center, S-1100

- Beverly Children's Learning Center
  600 Cummings Center, S-171-X

Samples were collected during both summer and winter seasons to allow for seasonal variation. In addition, during each sampling event, one sample was collected from an exterior location to establish local ambient background conditions. The exterior location chosen was the roof of the North Parking Deck (250 Cummings Center). The locations of the above-described locations are shown in **Figure 3**.

During each sampling event, a Summa canister was placed at each of the five previously designated sampling locations. At one of the indoor sampling locations, a second canister was placed in order to collect a duplicate sample. The sample collection duration was approximately twenty-four hours.

Samples were analyzed for the following parameters:

- Air-Phase Petroleum Hydrocarbons (APH)
- Volatile Organic Compounds (VOCs) using EPA Method TO-15

Where feasible, sample analysis was performed in the SIM mode to obtain the lowest achievable (i.e., most conservative) detection limits.

The first round of sampling was initiated on September 20, 2012 and concluded on September 21, 2012. A second round of sampling was initiated on February 4, 2013 and concluded on February 5, 2013. Care was taken during the second round to place the canisters as close to the exact locations as previous canister placement during the September 2012 sampling event.

On May 24, 2013, a report titled “Indoor Air Sampling Analysis and Risk Characterization Report" was submitted to EPA. This report included the results of the sampling efforts in 2012 and 2013 and included a risk characterization of the indoor air data results to determine if a potential significant risk to human health was present from the indoor air pathway. The results were mostly consistent regardless of whether EPA or MassDEP risk factors were utilized. For excess lifetime cancer risk, there appeared to be no significant risk in any of the sampling locations. Moreover, no significant cancer risk was calculated at any of the sampling locations using detected compounds. Only in the scenario were *undetected* compounds were included in the evaluation and background levels were excluded was a significant cancer risk calculated (using EPA cancer slope factors). Under that scenario, the majority of the cancer risk was from three *undetected* compounds (1,2-dibromomethane, benzyl chloride, and vinyl bromide), and even the outdoor background sample had a calculated significant cancer risk. Overall, no excess cancer risk existed or exists in any of the sampling locations, regardless of whether the source of the detected contaminants is related to vapor intrusion, interior sources, exterior background air, or a combination of any of these.

For the non-carcinogenic hazard index, the risk characterization results across the various calculated scenarios were even more consistent regardless of whether EPA or MassDEP risk factors were utilized, undetected compounds were included in the risk calculations, or whether exterior background was considered. Under all evaluated scenarios, there was no elevated hazard index for Suite 149-J in Building 100, Suite 1000 in Building 500, Suite 171-X in Building 600, or in the exterior background sample. There was an elevated hazard index for Suite 157-J in Building 100 for all evaluated scenarios. Nearly all of the cumulative hazard index in Suite 157-J resulted from the concentrations of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene (for the EPA risk calculation) and the concentrations of all three petroleum hydrocarbon fractions in the APH analysis (for the MassDEP risk calculation). 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene are compounds typically found in petroleum hydrocarbons; MassDEP does not quantify them individually for risk purposes since their presence in already included with the risk of the APH.

When evaluating the data in Suite 157-J from September 2012 and February 2013, elevated concentrations of APH and trimethylbenzenes were detected in both sampling events. The conclusion from this assessment was that airborne petroleum hydrocarbons were present in Suite 157-J that could be considered to be potential significant risk concern, based on the calculation methodology used for this assessment. Given that the exterior background samples had little to no detection of APH or trimethylbenzenes, the source of the petroleum hydrocarbons was not suspected to be coming from the outside. Remaining potential sources of the petroleum hydrocarbons thus included interior source(s) within the suite space and vapor intrusion from the previous USM operations.

No further actions were recommended in Suite 149-J in Building 100, Suite 1000 in Building 500, or Suite 171-X in Building 600. Additional air sampling was recommended to evaluate the concentrations of petroleum hydrocarbons in Suite 157-J.

3.0 FEBRUARY 2014 INDOOR AIR SAMPLE COLLECTION

3.1 Air Sample Collection

For the February 2014 sample collection, sampling was limited to the Suite 157-J space in Building 100 and an exterior collection location. Due to the presence of snow and ice, the roof of the North Parking Deck was not accessible. The outdoor location was relocated to the roof of the West Parking Garage (see **Figure 3**). Previous sampling efforts included only a single sampling location in Suite 157-J space. The previous sampling plan was revised to include three separate sampling locations within the space (see **Figure 4**). These sampling locations included:

- Administrative Office (noted as sample S-157-J). This is the same location used in the previous sampling efforts in 2012 and 2013.
- Activity room in central part of space (noted as sample S-157-J.1).
- Activity room near eastern building exit (noted as sample S-157-J.2).

Samples were collected By GEOSPHERE Environmental Management Inc, of Exeter, NH using a six-liter canister for the purposes of collecting a 24-hour composite. Canisters and regulators were provided by Alpha Analytical of Mansfield, MA. One canister was placed in each of the sampling locations as described above. In addition, a second canister was placed in the sampling location at S-157-J; this second canister represented a field duplicate. Sampling was initiated on February 7, 2014 and concluded on February 8, 2014. Details on the sampling canisters are provided in the table below:

Sample Location	Sampling Start Time and Date	Sampling Stop Time and Date	Canister ID	Regulator ID	Regulator Start Pressure (inches Hg)	Regulator Stop Pressure (inches Hg)
WPD	4:47 PM 2/7/14	4:03 PM 2/8/14	611	622	-29.83	-0.17
S-157-J	5:35 PM 2/7/14	4:14 PM 2/8/14	786	263	-27.67	-8.85
DUP (Duplicate of S-157-J)	5:38 PM 2/7/14	4:15 PM 2/8/14	1564	11	-30.66	-10.64
S-157-J.1	5:43 PM 2/7/14	4:16 PM 2/8/14	1679	625	-30.30	-16.14
S-157-J.2	5:47 PM 2/7/14	4:17 PM 2/8/14	1539	624	-30.04	-12.03

The canisters were received by Alpha Analytical on February 11, 2014 under a chain of custody. Samples were requested for analysis for the following parameters:

- Air-Phase Petroleum Hydrocarbons (APH)
- Volatile Organic Compounds (VOCs) using EPA Method TO-15

Sample analysis was requested to be performed in the SIM mode to obtain the lowest achievable (most conservative) detection limits. In accordance with the APH analytical method, the potential identification of non-APH compounds (such as chlorinated solvents, ketones, and ethers) may represent an interference with the quantitative response within the aliphatic or aromatic hydrocarbon range. A specific request was made for non-APH compounds to be identified in the laboratory report form or narrative, such that the data may be evaluated for such potential interference.

3.2 Meteorological Data During Sample Collection

The following weather conditions were observed from the weather station at the Beverly Municipal Airport during the days of sample collection:

Date	Mean Temperature (°F)	Mean Sea Level Pressure (Inches)	Mean Wind Speed (Miles Per Hour)	Precipitation (Inches)
2/7/2014	20.0	30.19	7.14	0.00
2/8/2014	21.7	30.20	7.12	0.00

4.0 SUMMARY OF AIR SAMPLING RESULTS

A summary of the air sampling results for samples collected in February 2014 is provided in **Table 1**. The full analytical report is presented in **Appendix A**.

For the purposes of initial data evaluation, analysis results were compared to the EPA Target Risk values (carcinogenic = 1E-06 or Hazard Index = 1.0) and the MassDEP Residential Threshold Values as presented in the July 30, 2012 QAPP. Exceedance of these values does not mean a significant risk to human health is present; a detailed site-specific risk evaluation was completed after the winter 2013 sampling event. This was documented in a report titled “Indoor Air Sampling Analysis and Risk Characterization Report" dated May 24, 2013. The conclusions of the risk characterization indicated a potential significant human health risk in the Suite 157-J space due to petroleum related compounds.

A total of 69 compounds (or groups of compounds) were included on the sample analysis list. 65 compounds were related to the VOC analysis using the EPA TO-15 method and 11 compounds were included for APH analysis. A total of seven compounds (1,3-butadiene, benzene, ethylbenzene, methyl-tert-butyl ether, toluene, m- & p-xylenes, and o-xylenes) were included in the analysis list for both methods.

A limited data validation was performed on the sample analysis in conformance with the QAPP. In summary, the data validation concluded that in general, the data appear to be valid as reported and may be used for decision-making purposes. The Data Validation Memo is included as **Appendix B**.

Of specific note, although a total of seven compounds (1,2,4-trimethylbenzene, 1,3-butadiene, benzene, carbon tetrachloride, chloroform, ethylbenzene, and naphthalene) were detected in one or more samples at levels that exceeded the EPA target risk values, no values were greater than ten times the EPA target risk values. Four of these compounds (1,3-butadiene, benzene, carbon tetrachloride, and ethylbenzene) were detected in all samples, including the outdoor background sample. Two of these four compounds (benzene and carbon tetrachloride) were detected in all samples (including the outdoor background sample) at levels that exceeded the EPA target risk value. The APH analysis detected three petroleum hydrocarbon fractions in one or more samples above the MassDEP target risk values, but these fractions were not detected in the outdoor background samples.

In addition, there were ten compounds from the VOC analyte list (1,1,2,2-tetrachloroethane, 1,2-dibromoethane, 1,4-dioxane, 3-chloropropene, benzyl chloride, bromodichloromethane, dibromochloromethane, hexachlorobutadiene, naphthalene, and vinyl bromide) where the method detection limit exceeded the EPA target risk value. Of these compounds, only naphthalene was detected in any sample.

A comparison of all indoor air samples collected in Suite 157-J between 2012 and 2014 is shown in **Table 2**. A total of six samples have been collected over that time period and the overall

results show a relatively consistent indication of the indoor air quality in the space regardless of sample location or time of year collected. A total of 35 compounds have been detected in at least one sample in Suite 157-J; 24 of those compounds have been detected in all six samples. An additional four compounds have been detected in at least four of the six samples. For the compounds detected consistently, there has been little variation in the detected concentrations.

5.0 CORRECTIVE ACTIONS

No corrective measures were necessary in regard to the field collection of samples, and no corrective measures were required during the laboratory analysis. Previous corrective measures implemented after the 2012 and 2013 sampling events were successful.

6.0 CONTINUED ACTIONS

The next sampling event is scheduled for the summer of 2014 and is intended to take place in August of 2014. The exact schedule will be determined after this report has been submitted to EPA, who will be provided, as requested, with one week advance notice of the sampling event. Due to the consistent nature of the data and the continued presence of petroleum-related compounds that may result in a significant risk to human health, additional sampling (soil gas) will be collected in conjunction with the next indoor air samples to determine if the presence of such compounds is a result of vapor intrusion. Samples will be collected from a total of four soil gas point locations. These locations are shown in **Figure 5**. At each location, a permanent soil gas point will be installed in accordance with MassDEP protocols. From each point, a single grab sample will be collected. Sample analysis will consist of the following parameters:

- Air-Phase Petroleum Hydrocarbons (APH)
- Volatile Organic Compounds (VOCs) using EPA Method TO-15

Sample analysis will be requested to be performed in the SIM mode to obtain the lowest achievable (most conservative) detection limits. In accordance with the APH analytical method, the potential identification of non-APH compounds (such as chlorinated solvents, ketones, and ethers) may represent an interference with the quantitative response within the aliphatic or aromatic hydrocarbon range. A specific request will be made for non-APH compounds to be identified in the laboratory report form or narrative, such that the data may be evaluated for such potential interference.

Figures

SITE COORDINATES
Longitude: -70.8871 W
Lattitude: 42.5596 N
UTM 4,713,634m N
345,086m E

Approximate Scale: 1 inch = 2,000 feet (1:24,000)

Figure 1 - Locus Plan

Former United Shoe Machinery North Parcel
181 Elliott Street
Beverly, MA

Project Number: 12201
Client: Cummings

Created By: EAF Date: 03/15/12
Checked By: BH Date: 03/15/12

Reference: MassGIS USGS Quadrangle: SALEM and MARBLEHEAD NORTH
Image: M/12201_Beverly/2012/Figures

Figure 2 - Site Plan

Former United Shoe
Machinery North Parcel
181 Elliott Street
Beverly, MA

LEGEND

Site Bound

N E S W

0 150 300 600
Feet

Approximate Scale: 1 inch = 300 feet

GEOSPHERE
ENVIRONMENTAL MANAGEMENT INC.
51 Portsmouth Ave. - Exeter, NH 03833 - (603) 773-0075

Project Number: 12201
Client: Cummings

Created By: EAF Date: 03/15/12
Checked By: BAH Date: 03/15/12

Reference: MassGIS 2008 15CM Orthophotos
Image: M/12201_Beverly/2012/Figures

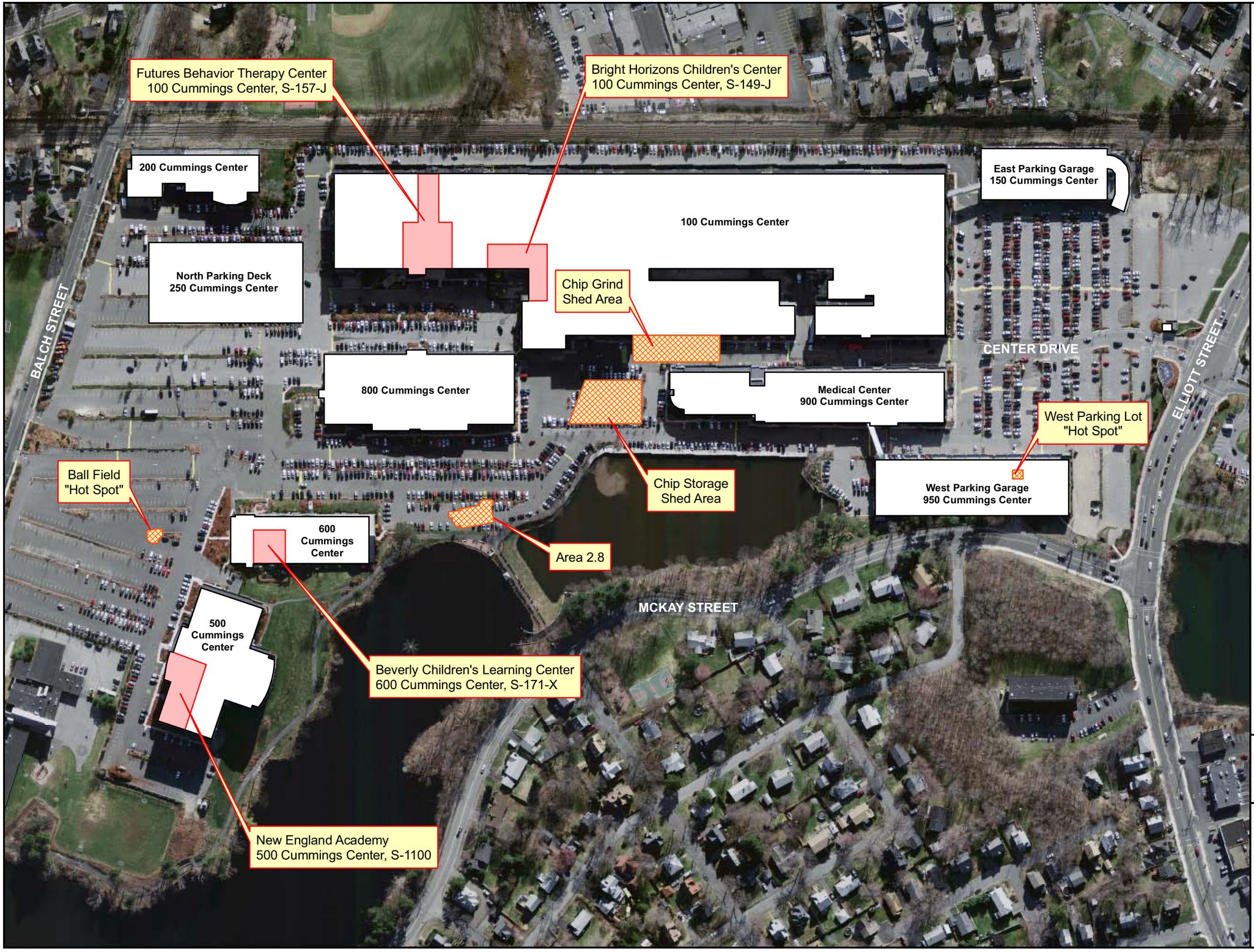


Figure 3
Building Areas Used As Child Day Care Centers Or Schools

Former United Shoe Machinery North Parcel
131 Elliott Street
Beverly, MA

LEGEND

- DAY CARE OR SCHOOL
- SOIL REMEDIATION AREA
- BUILDING

N E S W

0 100 200 400 Feet

Approximate Scale: 1 inch = 200 feet

GEOSPHERE
ENVIRONMENTAL MANAGEMENT INC.
51 Portsmouth Ave. - Exeter, NH 03833 - (603) 773-0075

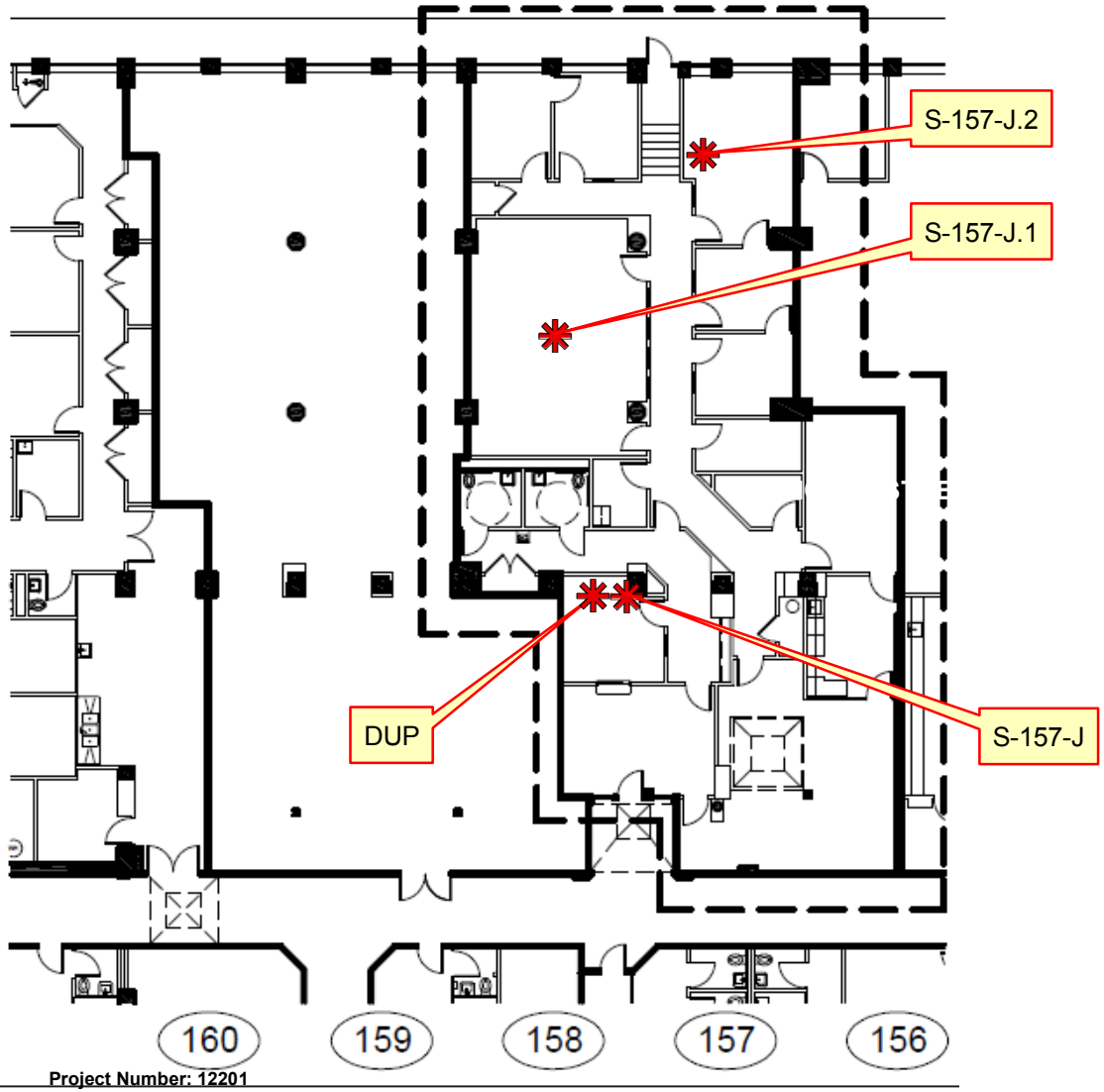
Project Number: 12201
Client: Cummings

Created By: EAF Date: 03/15/12
Modified By: AF Date: 04/15/13
Checked By: BAH Date: 04/15/13

Reference: MassGIS 2008 15CM Orthophotos
Image: M/12201_Beverly/2013/Figures

Figure 4
Indoor Air Sampling Locations

Futures Behavior Therapy Center
100 Cummings Center
(S-157-J)



GEOSPHERE
ENVIRONMENTAL MANAGEMENT INC.
51 Portsmouth Ave. - Exeter, NH 03833 - (603) 773-0075

Project Number: 12201
Client: Cummings
Created By: EF Date: 05/22/14
Checked By: DN Date: 05/22/14

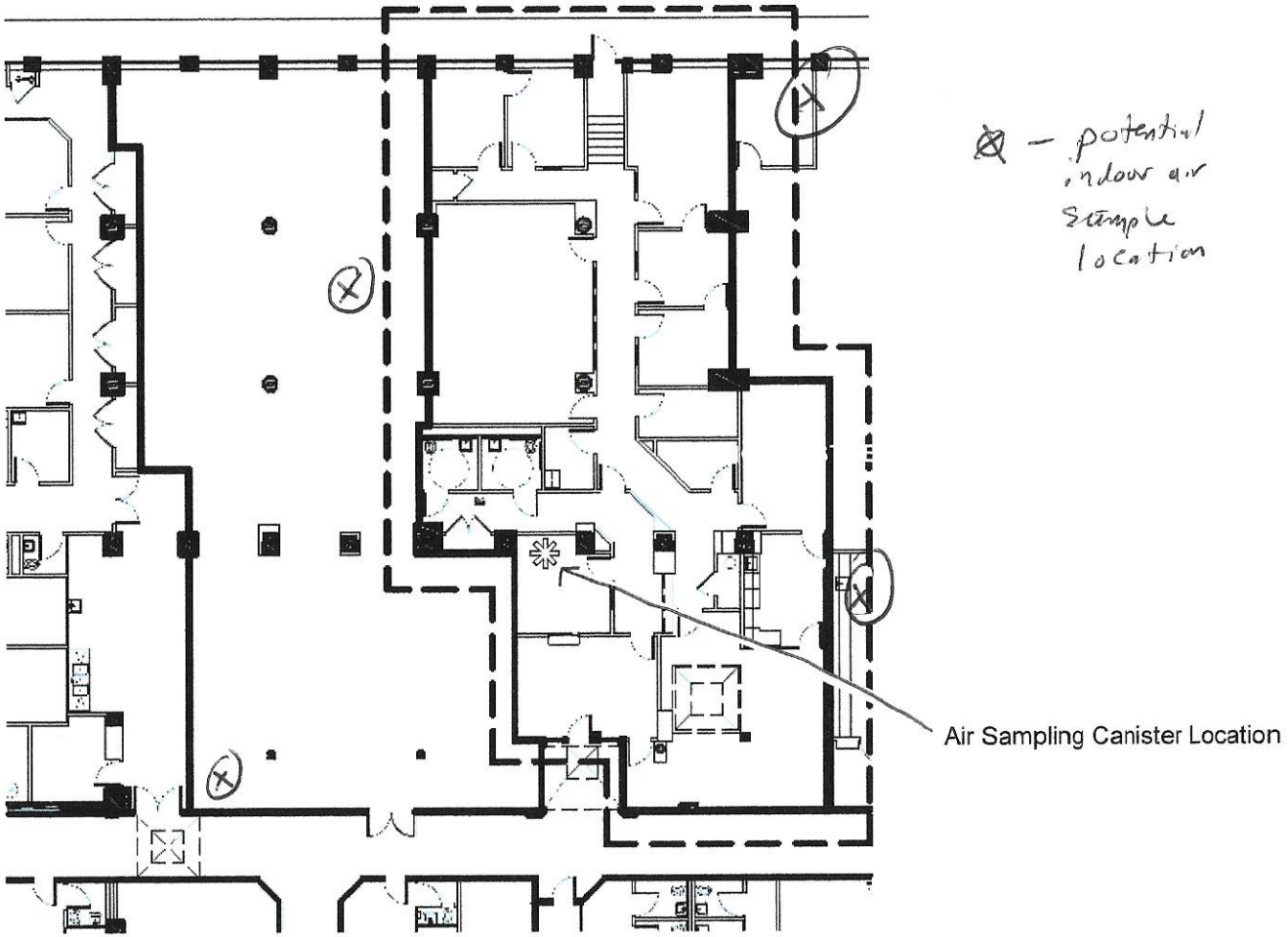
0 5' 10' 20' 40'

-All dimensions are appro...
-CPL standard constructi...

Reference:
Cummings Properties,
Engineering Plans, 05/27/2009

Figure 5
Air Sampling Location

Futures Behavior Therapy Center
100 Cummings Center
(S-157-J)



GEOSPHERE
ENVIRONMENTAL MANAGEMENT INC.
51 Portsmouth Ave. - Exeter, NH 03833 - (603) 773-0075

Project Number: 12201
Client: Cummings

Created By: AF Date: 11/7/12
Checked By: BAH Date: 11/8/2012

Reference:
Cummings Properties,
Engineering Plans, 05/27/2009

Tables

TABLE 1

Indoor Air Chemical Analysis Results
Cummings Center, Beverly, MA
February 2014

Sample ID	S-157-J	S-157-J (Duplicate)	S-157-J.1	S-157-J.2	WPD		
Sample Location	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J	Roof Exterior of Building 950 (West Parking Deck)		
Sample Type	Air	Air	Air	Air	Air	EPA Target Risk: Carcinogenic = 1E-06 or HI = 1.0	MassDEP Residential Threshold Values
Date Sampled	2/7/2014 to 2/8/2014	2/7/2014 to 2/8/2014	2/7/2014 to 2/8/2014	2/7/2014 to 2/8/2014	2/7/2014 to 2/8/2014		
Volatile Organic Compounds (µg/m3)							
1,1,1-trichloroethane	<0.109	<0.109	<0.109	<0.109	<0.109	5200 (HI)	3
1,1,1,2-tetrachloroethane	<0.137	<0.137	<0.137	<0.137	<0.137	0.33	
1,1,2,2-tetrachloroethane	<0.137	<0.137	<0.137	<0.137	<0.137	0.042	0.04
1,1,2-trichloroethane	<0.109	<0.109	<0.109	<0.109	<0.109	0.15	0.15
1,1-dichloroethane	<0.081	<0.081	<0.081	<0.081	<0.081	1.5	0.8
1,1-dichloroethene	<0.079	<0.079	<0.079	<0.079	<0.079	210 (HI)	0.8
1,2,4-trichlorobenzene	<0.371	<0.371	<0.371	<0.371	<0.371	2.1 (HI)	3.4
1,2,4-trimethylbenzene	**19.1**	**22.8**	**22.4**	**22.9**	<0.098	7.3 (HI)	
1,2-dibromoethane	<0.154	<0.154	<0.154	<0.154	<0.154	0.0041	
1,2-dichlorobenzene	<0.120	<0.120	<0.120	<0.120	<0.120	210 (HI)	0.72
1,2-dichloroethane	<0.081	<0.081	<0.081	<0.081	<0.081	0.094	0.09
1,2-dichloropropane	<0.092	<0.092	<0.092	<0.092	<0.092	0.24	0.13
1,3,5-trimethylbenzene	**5.6**	**6.69**	**6.49**	**6.69**	<0.098	7.3 (HI)	
1,3-butadiene	**0.091**	**0.119**	**0.142**	**0.115**	**0.053**	0.081	
1,3-dichlorobenzene	<0.120	<0.120	<0.120	<0.120	<0.120	200(HI)	0.6
1,4-dichlorobenzene	<0.120	<0.120	<0.120	<0.120	<0.120	0.22	0.5
1,4-dioxane	<0.721	<0.721	<0.721	<0.721	<0.721	0.32	0.59
2,2,4-trimethylpentane	<0.934	<0.934	<0.934	<0.934	<0.934	N/A	
2-butanone	**4.39**	**6.1**	**6.37**	**6.02**	<0.590	5200(HI)	12
2-hexanone	<0.820	<0.820	<0.820	<0.820	<0.820	31(HI)	
3-chloropropene	<0.626	<0.626	<0.626	<0.626	<0.626	0.41	
4-Ethyltoluene	**4.82**	**5.75**	**5.46**	**6.15**	<0.983	N/A	
Acetone	**32.8**	**44.9**	**48.9**	**43.2**	**4.58**	32,000(HI)	91
Benzene	**0.795**	**0.843**	**0.974**	**0.93**	**0.617**	0.31	2.3
Benzyl Chloride	<1.04	<1.04	<1.04	<1.04	<1.04	0.05	
Bromodichloromethane	<0.134	<0.134	<0.134	<0.134	<0.134	0.066	0.14
Bromoform	<0.207	<0.207	<0.207	<0.207	<0.207	2.2	2.2
Bromomethane	<0.078	<0.078	<0.078	<0.078	<0.078	5.2(HI)	
Carbon disulfide	<0.623	<0.623	<0.623	<0.623	<0.623	730 (HI)	
Carbon tetrachloride	**0.585**	**0.598**	**0.642**	**0.642**	**0.604**	0.41	0.54
Chlorobenzene	<0.092	<0.092	<0.092	<0.092	<0.092	52 (HI)	
Chloroethane	<0.053	<0.053	<0.053	<0.053	<0.053	10,000 (HI)	
Chloroform	**0.234**	**0.293**	**0.332**	**0.278**	<0.098	0.11	1.9
Chloromethane	**1.05**	**1.23**	**1.32**	**1.11**	**1.06**	94 (HI)	
Cis-1,2-dichloroethene	<0.079	**0.099**	**0.111**	**0.095**	<0.079	35 (HI)	0.8
Cis-1,3-dichloropropene	<0.091	<0.091	<0.091	<0.091	<0.091	0.61	0.6
Cyclohexane	**5.51**	**6.82**	**7.68**	**7.09**	**0.885**	6300 (HI)	
Dibromochloromethane	<0.170	<0.170	<0.170	<0.170	<0.170	0.09	0.1
Dichlorodifluoromethane	**2.09**	**0.964**	**1.11**	**1.67**	**2.04**	100 (HI)	
Ethanol	**183**	**243**	**279**	**220**	<4.71	N/A	
Ethyl acetate	<1.80	<1.80	<1.80	<1.80	<1.80	N/A	
Ethylbenzene	**1.21**	**1.4**	**1.61**	**1.55**	**0.13**	0.97	7.4
Freon-113	**0.491**	**0.628**	**0.927**	**0.552**	**0.552**	31,000 (HI)	
Freon-114	<0.349	<0.349	<0.349	<0.349	<0.349	N/A	
Hexachlorobutadiene	<0.533	<0.533	<0.533	<0.533	<0.533	0.11	4.6
Hexane	**5.89**	**5**	**5.29**	**5.92**	<0.705	730 (HI)	
Isopropyl alcohol	**178**	**256**	**244**	**219**	<1.23	7300 (HI)	
Methylene chloride	**39.6**	<3.47	<3.47	<3.47	<3.47	94 (HI)	5
MIBK	<0.820	<0.820	<0.820	<0.820	<0.820	3100 (HI)	2.2
MTBE	<0.072	<0.072	<0.072	<0.072	<0.072	9.4	39
M+p-xylene	**5.13**	**5.91**	**6.6**	**6.43**	**0.339**	100 (HI)	20
n-heptane	**1.19**	**1.42**	**1.8**	**1.7**	<0.820	N/A	
Naphthalene	<0.262	**0.267**	<0.262	<0.262	<0.262	0.072	0.61
o-xylene	**2.55**	**3.01**	**3.11**	**3.15**	**0.13**	100 (HI)	20
Propylene	<0.861	**1.03**	**0.981**	<0.861	<0.861	3100 (HI)	
Styrene	**0.179**	**0.213**	**0.341**	**0.26**	<0.085	1000 (HI)	1.4
Tetrachloroethylene	**0.183**	**0.176**	**0.251**	**0.217**	<0.136	0.41	1.4
Tetrahydrofuran	<0.590	<0.590	<0.590	<0.590	<0.590	2000 (HI)	
Toluene	**2.88**	**2.52**	**4.56**	**5.58**	**1.04**	3200 (HI)	54
Trans-1,2-dichloroethene	<0.079	<0.079	<0.079	<0.079	<0.079	63 (HI)	0.8
Trans-1,3-dichloropropene	<0.091	<0.091	<0.091	<0.091	<0.091	0.61	0.6
Trichloroethene	<0.107	<0.107	**0.113**	<0.107	<0.107	0.43	0.8
Trichlorofluoromethane	**1.35**	**1.7**	**1.82**	**1.49**	**1.39**	730 (HI)	
Vinyl acetate	<0.704	<0.704	<0.704	<0.704	<0.704	210 (HI)	
Vinyl bromide	<0.874	<0.874	<0.874	<0.874	<0.874	0.076	
Vinyl chloride	<0.051	<0.051	<0.051	<0.051	<0.051	0.16	0.27

TABLE 1

Indoor Air Chemical Analysis Results
Cummings Center, Beverly, MA
February 2014

Sample ID	S-157-J	S-157-J (Duplicate)	S-157-J.1	S-157-J.2	WPD		
Sample Location	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J	Roof Exterior of Building 950 (West Parking Deck)		
Sample Type	Air	Air	Air	Air	Air	EPA Target Risk: Carcinogenic = 1E-06 or HI = 1.0	MassDEP Residential Threshold Values
Date Sampled	2/7/2014 to 2/8/2014	2/7/2014 to 2/8/2014	2/7/2014 to 2/8/2014	2/7/2014 to 2/8/2014	2/7/2014 to 2/8/2014		
Volatile Organic Compounds (µg/m3)							
Air-Phase Petroleum Hydrocarbon Target Analytes - APH (µg/m3)							
1,3-Butadiene	<2.0	<2.0	<2.0	<2.0	<2.0	0.081	
Methyl-tert-butyl ether	<2.0	<2.0	<2.0	<2.0	<2.0	9.4	39
Benzene	<2.0	<2.0	<2.0	<2.0	<2.0	0.31	2.3
Toluene	**2.9**	**2.6**	**4.7**	**5.8**	<2.0	3200 (HI)	54
Ethylbenzene	<2.0	<2.0	<2.0	<2.0	<2.0	0.97	7.4
m- & p- Xylenes	**5**	**5.7**	**6.5**	**6.6**	<4.0	100 (HI)	20
o-Xylenes	**2.4**	**3**	**3.2**	**3.1**	<2.0	100 (HI)	20
Naphthalene	<2.0	<2.0	<2.0	<2.0	<2.0	0.072	0.61
Air-Phase Petroleum Hydrocarbons - APH (µg/m3)							
C_5-C_8 Aliphatic Hydrocarbons	**66**	**53**	**58**	**55**	<12	N/A	58
C_9-C_{12} Aliphatic Hydrocarbons	**230**	**270**	**270**	**270**	<14	N/A	68
C_9-C_{10} Aromatic Hydrocarbons	**61**	**72**	**71**	**74**	<10	N/A	10

Notes:
Samples collected by Geosphere Environmental Management
Samples submitted to Alpha Analytical of Mansfield, MA
Results presented in µg/m3
NA - Not Analyzed
E - estimated
BOLD = Detected above laboratory standards
gray shaded = detected above applicable standard
blue shaded = analytical detection limit above applicable standard
< = not detected above laboratory detection limit shown
EPA Target Risk Levels are from Regional Screening Level Resident Air Supporting Table, November 2011. Values preceding "(HI)" indicate compounds that are not considered to be carcinogenic and risk levels are based on noncarcinogenic risk. "N/A" indicates compounds with no risk information available from this source.
MassDEP Residential Threshold Values are from Interim Final Vapor Intrusion Guidance, MassDEP Policy WSC# 11-435, December 2011.

TABLE 2

Comparison of Indoor Air Chemical Analysis Results - Building 100 Suite 157-J
Cummings Center, Beverly, MA
September 2012 to February 2014

Sample ID	S-157-J	S-157-J	S-157-J	S-157-J (Duplicate)	S-157-J.1	S-157-J.2		
Sample Location	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J		
Sample Type	Air	Air	Air	Air	Air	Air	EPA Target Risk: Carcinogenic = 1E-06 or HI = 1.0	MassDEP Residential Threshold Values
Date Sampled	9/20/2012 to 9/21/2012	2/4/2013 to 2/5/2013	2/7/2014 to 2/8/2014	2/7/2014 to 2/8/2014	2/7/2014 to 2/8/2014	2/7/2014 to 2/8/2014		
Volatile Organic Compounds (µg/m3)								
1,1,1-trichloroethane	<0.109	**0.109**	<0.109	<0.109	<0.109	<0.109	5200 (HI)	3
1,1,1,2-tetrachloroethane	<0.137	<0.137	<0.137	<0.137	<0.137	<0.137	0.33	
1,1,2,2-tetrachloroethane	<0.137	<0.137	<0.137	<0.137	<0.137	<0.137	0.042	0.04
1,1,2-trichloroethane	<0.109	<0.109	<0.109	<0.109	<0.109	<0.109	0.15	0.15
1,1-dichloroethane	<0.081	<0.081	<0.081	<0.081	<0.081	<0.081	1.5	0.8
1,1-dichloroethene	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	210 (HI)	0.8
1,2,4-trichlorobenzene	<0.371	<0.371	<0.371	<0.371	<0.371	<0.371	2.1 (HI)	3.4
1,2,4-trimethylbenzene	**19.8**	**54.6**	**19.1**	**22.8**	**22.4**	**22.9**	7.3 (HI)	
1,2-dibromoethane	<0.154	<0.154	<0.154	<0.154	<0.154	<0.154	0.0041	
1,2-dichlorobenzene	<0.12	<0.12	<0.120	<0.120	<0.120	<0.120	210 (HI)	0.72
1,2-dichloroethane	**0.227**	**0.093**	<0.081	<0.081	<0.081	<0.081	0.094	0.09
1,2-dichloropropane	<0.092	<0.092	<0.092	<0.092	<0.092	<0.092	0.24	0.13
1,3,5-trimethylbenzene	**5.21**	**13.5**	**5.6**	**6.69**	**6.49**	**6.69**	7.3 (HI)	
1,3-butadiene	**0.058**	**0.051**	**0.091**	**0.119**	**0.142**	**0.115**	0.081	
1,3-dichlorobenzene	<0.12	<0.12	<0.120	<0.120	<0.120	<0.120	200(HI)	0.6
1,4-dichlorobenzene	<0.12	<0.12	<0.120	<0.120	<0.120	<0.120	0.22	0.5
1,4-dioxane	NA	<0.721	<0.721	<0.721	<0.721	<0.721	0.32	0.59
2,2,4-trimethylpentane	<0.934	<0.934	<0.934	<0.934	<0.934	<0.934	N/A	
2-butanone	**2.04**	**1.04**	**4.39**	**6.1**	**6.37**	**6.02**	5200(HI)	12
2-hexanone	<0.82	<0.82	<0.820	<0.820	<0.820	<0.820	31(HI)	
3-chloropropene	NA	<0.626	<0.626	<0.626	<0.626	<0.626	0.41	
4-Ethyltoluene	**4.56**	**12.4**	**4.82**	**5.75**	**5.46**	**6.15**	N/A	
Acetone	**70.8**	**51.3**	**32.8**	**44.9**	**48.9**	**43.2**	32,000(HI)	91
Benzene	**0.323**	**0.696**	**0.795**	**0.843**	**0.974**	**0.93**	0.31	2.3
Benzyl Chloride	NA	<1.04	<1.04	<1.04	<1.04	<1.04	0.05	
Bromodichloromethane	<0.134	<0.134	<0.134	<0.134	<0.134	<0.134	0.066	0.14
Bromoform	<0.207	<0.207	<0.207	<0.207	<0.207	<0.207	2.2	2.2
Bromomethane	<0.078	<0.078	<0.078	<0.078	<0.078	<0.078	5.2(HI)	
Carbon disulfide	<0.623	<0.623	<0.623	<0.623	<0.623	<0.623	730 (HI)	
Carbon tetrachloride	**0.302**	**0.572**	**0.585**	**0.598**	**0.642**	**0.642**	0.41	0.54
Chlorobenzene	<0.092	<0.092	<0.092	<0.092	<0.092	<0.092	52 (HI)	
Chloroethane	<0.053	<0.053	<0.053	<0.053	<0.053	<0.053	10,000 (HI)	
Chloroform	**0.596**	**0.288**	**0.234**	**0.293**	**0.332**	**0.278**	0.11	1.9
Chloromethane	<1.03	<1.03	**1.05**	**1.23**	**1.32**	**1.11**	94 (HI)	
Cis-1,2-dichloroethene	**0.123**	**0.131**	<0.079	**0.099**	**0.111**	**0.095**	35 (HI)	0.8
Cis-1,3-dichloropropene	<0.091	<0.091	<0.091	<0.091	<0.091	<0.091	0.61	0.6
Cyclohexane	**56.4**	<0.688	**5.51**	**6.82**	**7.68**	**7.09**	6300 (HI)	
Dibromochloromethane	<0.17	<0.17	<0.170	<0.170	<0.170	<0.170	0.09	0.1
Dichlorodifluoromethane	**0.737**	**2.21**	**2.09**	**0.964**	**1.11**	**1.67**	100 (HI)	
Ethanol	**511**	**115**	**183**	**243**	**279**	**220**	N/A	
Ethyl acetate	<1.80	<1.80	<1.80	<1.80	<1.80	<1.80	N/A	
Ethylbenzene	**0.586**	**0.964**	**1.21**	**1.4**	**1.61**	**1.55**	0.97	7.4
Freon-113	**0.498**	**0.491**	**0.491**	**0.628**	**0.927**	**0.552**	31,000 (HI)	
Freon-114	<0.349	<0.349	<0.349	<0.349	<0.349	<0.349	N/A	
Hexachlorobutadiene	<0.533	<0.533	<0.533	<0.533	<0.533	<0.533	0.11	4.6
Hexane	**4.3**	**0.747**	**5.89**	**5**	**5.29**	**5.92**	730 (HI)	
Isopropyl alcohol	**235 E**	**396 E**	**178**	**256**	**244**	**219**	7300 (HI)	
Methylene chloride	**10.5**	<4.86	**39.6**	<3.47	<3.47	<3.47	94 (HI)	5
MIBK	**1.17**	<0.82	<0.820	<0.820	<0.820	<0.820	3100 (HI)	2.2
MTBE	<0.072	<0.072	<0.072	<0.072	<0.072	<0.072	9.4	39
M+p-xylene	**1.71**	**3.21**	**5.13**	**5.91**	**6.6**	**6.43**	100 (HI)	20
n-heptane	NA	<0.820	**1.19**	**1.42**	**1.8**	**1.7**	N/A	
Naphthalene	NA	**0.367**	<0.262	**0.267**	<0.262	<0.262	0.072	0.61
o-xylene	**0.96**	**2.34**	**2.55**	**3.01**	**3.11**	**3.15**	100 (HI)	20
Propylene	<0.86	<0.861	<0.861	**1.03**	**0.981**	<0.861	3100 (HI)	
Styrene	**0.588**	**0.379**	**0.179**	**0.213**	**0.341**	**0.26**	1000 (HI)	1.4
Tetrachloroethylene	**0.312**	**0.183**	**0.183**	**0.176**	**0.251**	**0.217**	0.41	1.4
Tetrahydrofuran	<0.59	<0.59	<0.590	<0.590	<0.590	<0.590	2000 (HI)	
Toluene	**2.67**	**2.51**	**2.88**	**2.52**	**4.56**	**5.58**	3200 (HI)	54
Trans-1,2-dichloroethene	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	63 (HI)	0.8
Trans-1,3-dichloropropene	<0.091	<0.091	<0.091	<0.091	<0.091	<0.091	0.61	0.6
Trichloroethene	<0.107	<0.107	<0.107	<0.107	**0.113**	<0.107	0.43	0.8
Trichlorofluoromethane	**1.15**	**1.26**	**1.35**	**1.7**	**1.82**	**1.49**	730 (HI)	
Vinyl acetate	NA	<0.704	<0.704	<0.704	<0.704	<0.704	210 (HI)	
Vinyl bromide	NA	<0.874	<0.874	<0.874	<0.874	<0.874	0.076	
Vinyl chloride	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	0.16	0.27

TABLE 2

Comparison of Indoor Air Chemical Analysis Results - Building 100 Suite 157-J
Cummings Center, Beverly, MA
September 2012 to February 2014

Sample ID	S-157-J	S-157-J	S-157-J	S-157-J (Duplicate)	S-157-J.1	S-157-J.2		
Sample Location	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J		
Sample Type	Air	Air	Air	Air	Air	Air		
Date Sampled	9/20/2012 to 9/21/2012	2/4/2013 to 2/5/2013	2/7/2014 to 2/8/2014	2/7/2014 to 2/8/2014	2/7/2014 to 2/8/2014	2/7/2014 to 2/8/2014	EPA Target Risk: Carcinogenic = 1E-06 or HI = 1.0	MassDEP Residential Threshold Values
Volatile Organic Compounds (µg/m3)								
Air-Phase Petroleum Hydrocarbon Target Analytes - APH (µg/m3)								
1,3-Butadiene	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	0.081	
Methyl-tert-butyl ether	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	9.4	39
Benzene	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	0.31	2.3
Toluene	**2.3**	**2.5**	**2.9**	**2.6**	**4.7**	**5.8**	3200 (HI)	54
Ethylbenzene	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	0.97	7.4
m- & p- Xylenes	<4.0	<4.0	**5**	**5.7**	**6.5**	**6.6**	100 (HI)	20
o-Xylenes	<2.0	**2.3**	**2.4**	**3**	**3.2**	**3.1**	100 (HI)	20
Naphthalene	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	0.072	0.61
Air-Phase Petroleum Hydrocarbons - APH (µg/m3)								
C_5-C_8 Aliphatic Hydrocarbons	**320**	**41**	**66**	**53**	**58**	**55**	N/A	58
C_9-C_{12} Aliphatic Hydrocarbons	**190**	**200**	**230**	**270**	**270**	**270**	N/A	68
C_9-C_{10} Aromatic Hydrocarbons	**61**	**160**	**61**	**72**	**71**	**74**	N/A	10

Notes:
Samples collected by Geosphere Environmental Management
Samples submitted to Alpha Analytical of Mansfield, MA
Results presented in µg/m3
NA - Not Analyzed
E - estimated
BOLD = Detected above laboratory standards
gray shaded = detected above applicable standard
blue shaded = analytical detection limit above applicable standard
< = not detected above laboratory detection limit shown
EPA Target Risk Levels are from Regional Screening Level Resident Air Supporting Table, November 2011. Values preceding "(HI)" indicate compounds that are not considered to be carcinogenic and risk levels are based on noncarcinogenic risk. "N/A" indicates compounds with no risk information available from this source.
MassDEP Residential Threshold Values are from Interim Final Vapor Intrusion Guidance, MassDEP Policy WSC# 11-435, December 2011.

Appendix A

Laboratory Analysis Report

ANALYTICAL REPORT

Lab Number:	L1403217
Client:	Geosphere Environmental Mgmt, Inc 51 Portsmouth Avenue Exeter, NH 03833
ATTN:	David Niemeyer
Phone:	(603) 773-0075
Project Name:	CUMMINGS BEVERLY AIR SAMPLING
Project Number:	12201
Report Date:	02/18/14

Certifications & Approvals: NY (11627), CT (PH-0141), NH (2206), NJ NELAP (MA015), RI (LAO00299), PA (68-02089), LA NELAP (03090), FL (E87814), TX (T104704419), WA (C954), DOD (L2217.01), USDA (Permit #P330-11-00109), US Army Corps of Engineers.

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1403217
Report Date: 02/18/14

Alpha Sample ID	Client ID	Sample Location	Collection Date/Time
L1403217-01	WPD	BEVERLY, MA	02/08/14 16:03
L1403217-02	S-157-J	BEVERLY, MA	02/08/14 16:14
L1403217-03	DUP	BEVERLY, MA	02/08/14 16:15
L1403217-04	S-157-J.1	BEVERLY, MA	02/08/14 16:16
L1403217-05	S-157-J.2	BEVERLY, MA	02/08/14 16:17

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1403217

Project Number: 12201 **Report Date:** 02/18/14

MADEP MCP Response Action Analytical Report Certification

This form provides certifications for all samples performed by MCP methods. Please refer to the Sample Results and Container Information sections of this report for specification of MCP methods used for each analysis. The following questions pertain only to MCP Analytical Methods.

An affirmative response to questions A through F is required for "Presumptive Certainty" status		
A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	YES
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	YES
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	YES
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data?"	YES
E a.	VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	YES
E b.	APH and TO-15 Methods only: Was the complete analyte list reported for each method?	YES
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	YES

A response to questions G, H and I is required for "Presumptive Certainty" status		
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	NO
H	Were all QC performance standards specified in the CAM protocol(s) achieved?	YES
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	YES

For any questions answered "No", please refer to the case narrative section on the following page(s).

Please note that sample matrix information is located in the Sample Results section of this report.

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1403217
Project Number: 12201 **Report Date:** 02/18/14

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. Performance criteria for CAM and RCP methods allow for some LCS compound failures to occur and still be within method compliance. In these instances, the specific failures are not narrated but are noted in the associated QC table. This information is also incorporated in the Data Usability format for our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name:	CUMMINGS BEVERLY AIR SAMPLING	**Lab Number:**	L1403217
Project Number:	12201	**Report Date:**	02/18/14

Case Narrative (continued)

Canisters were released from the laboratory on February 5, 2014. The canister certification results are provided as an addendum.

The sample designated WPD (L1403217-01) had a RPD for the pre- and post-flow controller calibration check (29% RPD) that was outside of the control limit (20% RPD). The initial flow rate for the flow controller was 3.0 mL/minute; the final flow rate was 4.0 mL/minute. The final pressure recorded by the laboratory of the associated canister was 2.4 inches of mercury.

Volatile Organics in Air (SIM)
Sample L1403217-03 and -04 were re-analyzed on dilution in order to quantify the samples within the calibration range. The results should be considered estimated, and are qualified with an E flag, for any compound that exceeded the calibration range in the initial analysis. The re-analysis was performed only for the compound that exceeded the calibration range.

MCP Related Narratives
Petroleum Hydrocarbons in Air
In reference to question G:
One or more of the target analytes did not achieve the requested CAM reporting limits.

L1403217-01 through -05: All significant concentrations of non-petroleum VOCs detected in the TO-15 analysis were subtracted from the corresponding hydrocarbon ranges.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Kathleen O'Brien

Title: Technical Director/Representative Date: 02/18/14

AIR

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-01
Client ID: WPD
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 02/14/14 19:30
Analyst: AR

Date Collected: 02/08/14 16:03
Date Received: 02/11/14
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Propylene	ND	0.500	--	ND	0.861	--		1
Ethanol	ND	2.50	--	ND	4.71	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	1.93	1.00	--	4.58	2.38	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	ND	0.200	--	ND	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Cyclohexane	0.257	0.200	--	0.885	0.688	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-01
Client ID: WPD
Sample Location: BEVERLY, MA
Date Collected: 02/08/14 16:03
Date Received: 02/11/14
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	68		60-140
Bromochloromethane	70		60-140
chlorobenzene-d5	78		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-01
Client ID: WPD
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 48,TO-15-SIM
Analytical Date: 02/14/14 19:30
Analyst: AR

Date Collected: 02/08/14 16:03
Date Received: 02/11/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
Dichlorodifluoromethane	0.413	0.050	--	2.04	0.247	--		1
Chloromethane	0.511	0.500	--	1.06	1.03	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	0.024	0.020	--	0.053	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Trichlorofluoromethane	0.248	0.050	--	1.39	0.281	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	ND	1.00	--	ND	3.47	--		1
Freon-113	0.072	0.050	--	0.552	0.383	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Chloroform	ND	0.020	--	ND	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	0.193	0.100	--	0.617	0.319	--		1
Carbon tetrachloride	0.096	0.020	--	0.604	0.126	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-01
Client ID: WPD
Sample Location: BEVERLY, MA
Date Collected: 02/08/14 16:03
Date Received: 02/11/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	0.277	0.050	--	1.04	0.188	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Ethylbenzene	0.030	0.020	--	0.130	0.087	--		1
p/m-Xylene	0.078	0.040	--	0.339	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	0.030	0.020	--	0.130	0.087	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,2,4-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-difluorobenzene	73		60-140
bromochloromethane	89		60-140
chlorobenzene-d5	84		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-02
Client ID: S-157-J
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 02/15/14 07:40
Analyst: AR

Date Collected: 02/08/14 16:14
Date Received: 02/11/14
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Propylene	ND	0.500	--	ND	0.861	--		1
Ethanol	97.0	2.50	--	183	4.71	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	13.8	1.00	--	32.8	2.38	--		1
Isopropanol	72.6	0.500	--	178	1.23	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	1.49	0.200	--	4.39	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	1.67	0.200	--	5.89	0.705	--		1
Cyclohexane	1.60	0.200	--	5.51	0.688	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	0.290	0.200	--	1.19	0.820	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	0.980	0.200	--	4.82	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-02
Client ID: S-157-J
Sample Location: BEVERLY, MA
Date Collected: 02/08/14 16:14
Date Received: 02/11/14
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	72		60-140
Bromochloromethane	76		60-140
chlorobenzene-d5	70		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-02
Client ID: S-157-J
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 48,TO-15-SIM
Analytical Date: 02/15/14 07:40
Analyst: AR

Date Collected: 02/08/14 16:14
Date Received: 02/11/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
Dichlorodifluoromethane	0.422	0.050	--	2.09	0.247	--		1
Chloromethane	0.507	0.500	--	1.05	1.03	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	0.041	0.020	--	0.091	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Trichlorofluoromethane	0.241	0.050	--	1.35	0.281	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	11.4	1.00	--	39.6	3.47	--		1
Freon-113	0.064	0.050	--	0.491	0.383	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Chloroform	0.048	0.020	--	0.234	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	0.249	0.100	--	0.795	0.319	--		1
Carbon tetrachloride	0.093	0.020	--	0.585	0.126	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1403217

Project Number: 12201 **Report Date:** 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-02 Date Collected: 02/08/14 16:14

Client ID: S-157-J Date Received: 02/11/14

Sample Location: BEVERLY, MA Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	Results	RL	MDL	Results	RL	MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab								
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	0.763	0.050	--	2.88	0.188	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	0.027	0.020	--	0.183	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Ethylbenzene	0.279	0.020	--	1.21	0.087	--		1
p/m-Xylene	1.18	0.040	--	5.13	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	0.042	0.020	--	0.179	0.085	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	0.586	0.020	--	2.55	0.087	--		1
1,3,5-Trimethybenzene	1.14	0.020	--	5.60	0.098	--		1
1,2,4-Trimethylbenzene	3.89	0.020	--	19.1	0.098	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	77		60-140
bromochloromethane	97		60-140
chlorobenzene-d5	75		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-03
Client ID: DUP
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 02/15/14 06:36
Analyst: AR

Date Collected: 02/08/14 16:15
Date Received: 02/11/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Propylene	0.601	0.500	--	1.03	0.861	--		1
Ethanol	129	2.50	--	243	4.71	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	18.9	1.00	--	44.9	2.38	--		1
Isopropanol	106	0.500	--	261	1.23	--	E	1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	2.07	0.200	--	6.11	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	1.42	0.200	--	5.00	0.705	--		1
Cyclohexane	1.98	0.200	--	6.82	0.688	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	0.346	0.200	--	1.42	0.820	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	1.17	0.200	--	5.75	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-03
Client ID: DUP
Sample Location: BEVERLY, MA
Date Collected: 02/08/14 16:15
Date Received: 02/11/14
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	70		60-140
Bromochloromethane	63		60-140
chlorobenzene-d5	72		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-03
Client ID: DUP
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 48,TO-15-SIM
Analytical Date: 02/15/14 06:36
Analyst: AR

Date Collected: 02/08/14 16:15
Date Received: 02/11/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
Dichlorodifluoromethane	0.195	0.050	--	0.964	0.247	--		1
Chloromethane	0.596	0.500	--	1.23	1.03	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	0.054	0.020	--	0.119	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Trichlorofluoromethane	0.302	0.050	--	1.70	0.281	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	ND	1.00	--	ND	3.47	--		1
Freon-113	0.082	0.050	--	0.628	0.383	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
cis-1,2-Dichloroethene	0.025	0.020	--	0.099	0.079	--		1
Chloroform	0.060	0.020	--	0.293	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	0.264	0.100	--	0.843	0.319	--		1
Carbon tetrachloride	0.095	0.020	--	0.598	0.126	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1403217
Project Number: 12201 **Report Date:** 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-03 Date Collected: 02/08/14 16:15
Client ID: DUP Date Received: 02/11/14
Sample Location: BEVERLY, MA Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	Results	RL	MDL	Results	RL	MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab								
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	0.669	0.050	--	2.52	0.188	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	0.026	0.020	--	0.176	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Ethylbenzene	0.322	0.020	--	1.40	0.087	--		1
p/m-Xylene	1.36	0.040	--	5.91	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	0.050	0.020	--	0.213	0.085	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	0.693	0.020	--	3.01	0.087	--		1
1,3,5-Trimethybenzene	1.36	0.020	--	6.69	0.098	--		1
1,2,4-Trimethylbenzene	4.64	0.020	--	22.8	0.098	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	0.051	0.050	--	0.267	0.262	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	75		60-140
bromochloromethane	80		60-140
chlorobenzene-d5	77		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-03 D
Client ID: DUP
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 02/15/14 08:55
Analyst: AR

Date Collected: 02/08/14 16:15
Date Received: 02/11/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Isopropanol	104	0.834	--	256	2.05	--		1.667

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-Difluorobenzene	68		60-140
Bromochloromethane	63		60-140
chlorobenzene-d5	69		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-04
Client ID: S-157-J.1
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 02/15/14 07:08
Analyst: AR

Date Collected: 02/08/14 16:16
Date Received: 02/11/14
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Propylene	0.570	0.500	--	0.981	0.861	--		1
Ethanol	148	2.50	--	279	4.71	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	20.6	1.00	--	48.9	2.38	--		1
Isopropanol	108	0.500	--	265	1.23	--	E	1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	2.16	0.200	--	6.37	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	1.50	0.200	--	5.29	0.705	--		1
Cyclohexane	2.23	0.200	--	7.68	0.688	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	0.440	0.200	--	1.80	0.820	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	1.11	0.200	--	5.46	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-04
Client ID: S-157-J.1
Sample Location: BEVERLY, MA
Date Collected: 02/08/14 16:16
Date Received: 02/11/14
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	67		60-140
Bromochloromethane	62		60-140
chlorobenzene-d5	67		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-04
Client ID: S-157-J.1
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 48,TO-15-SIM
Analytical Date: 02/15/14 07:08
Analyst: AR

Date Collected: 02/08/14 16:16
Date Received: 02/11/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
Dichlorodifluoromethane	0.224	0.050	--	1.11	0.247	--		1
Chloromethane	0.637	0.500	--	1.32	1.03	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	0.064	0.020	--	0.142	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Trichlorofluoromethane	0.323	0.050	--	1.82	0.281	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	ND	1.00	--	ND	3.47	--		1
Freon-113	0.121	0.050	--	0.927	0.383	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
cis-1,2-Dichloroethene	0.028	0.020	--	0.111	0.079	--		1
Chloroform	0.068	0.020	--	0.332	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	0.305	0.100	--	0.974	0.319	--		1
Carbon tetrachloride	0.102	0.020	--	0.642	0.126	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Trichloroethene	0.021	0.020	--	0.113	0.107	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-04
Client ID: S-157-J.1
Sample Location: BEVERLY, MA
Date Collected: 02/08/14 16:16
Date Received: 02/11/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	Results	RL	MDL	Results	RL	MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab								
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	1.21	0.050	--	4.56	0.188	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	0.037	0.020	--	0.251	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Ethylbenzene	0.371	0.020	--	1.61	0.087	--		1
p/m-Xylene	1.52	0.040	--	6.60	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	0.080	0.020	--	0.341	0.085	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	0.716	0.020	--	3.11	0.087	--		1
1,3,5-Trimethybenzene	1.32	0.020	--	6.49	0.098	--		1
1,2,4-Trimethylbenzene	4.55	0.020	--	22.4	0.098	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	71		60-140
bromochloromethane	78		60-140
chlorobenzene-d5	73		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-04 D
Client ID: S-157-J.1
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 02/15/14 10:23
Analyst: AR

Date Collected: 02/08/14 16:16
Date Received: 02/11/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Isopropanol	99.3	0.834	--	244	2.05	--		1.667

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-Difluorobenzene	63		60-140
Bromochloromethane	68		60-140
chlorobenzene-d5	60		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-05
Client ID: S-157-J.2
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 02/14/14 21:38
Analyst: AR

Date Collected: 02/08/14 16:17
Date Received: 02/11/14
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Propylene	ND	0.500	--	ND	0.861	--		1
Ethanol	117	2.50	--	220	4.71	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	18.2	1.00	--	43.2	2.38	--		1
Isopropanol	89.0	0.500	--	219	1.23	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	2.04	0.200	--	6.02	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	1.68	0.200	--	5.92	0.705	--		1
Cyclohexane	2.06	0.200	--	7.09	0.688	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	0.415	0.200	--	1.70	0.820	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	1.25	0.200	--	6.15	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-05
Client ID: S-157-J.2
Sample Location: BEVERLY, MA
Date Collected: 02/08/14 16:17
Date Received: 02/11/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-Difluorobenzene	67		60-140
Bromochloromethane	70		60-140
chlorobenzene-d5	68		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-05
Client ID: S-157-J.2
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 48,TO-15-SIM
Analytical Date: 02/14/14 21:38
Analyst: AR

Date Collected: 02/08/14 16:17
Date Received: 02/11/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
Dichlorodifluoromethane	0.337	0.050	--	1.67	0.247	--		1
Chloromethane	0.539	0.500	--	1.11	1.03	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	0.052	0.020	--	0.115	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Trichlorofluoromethane	0.265	0.050	--	1.49	0.281	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	ND	1.00	--	ND	3.47	--		1
Freon-113	0.072	0.050	--	0.552	0.383	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
cis-1,2-Dichloroethene	0.024	0.020	--	0.095	0.079	--		1
Chloroform	0.057	0.020	--	0.278	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	0.291	0.100	--	0.930	0.319	--		1
Carbon tetrachloride	0.102	0.020	--	0.642	0.126	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

SAMPLE RESULTS

Lab ID: L1403217-05
Client ID: S-157-J.2
Sample Location: BEVERLY, MA
Date Collected: 02/08/14 16:17
Date Received: 02/11/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	Results	RL	MDL	Results	RL	MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab								
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	1.48	0.050	--	5.58	0.188	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	0.032	0.020	--	0.217	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Ethylbenzene	0.356	0.020	--	1.55	0.087	--		1
p/m-Xylene	1.48	0.040	--	6.43	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	0.061	0.020	--	0.260	0.085	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	0.726	0.020	--	3.15	0.087	--		1
1,3,5-Trimethybenzene	1.36	0.020	--	6.69	0.098	--		1
1,2,4-Trimethylbenzene	4.66	0.020	--	22.9	0.098	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	71		60-140
bromochloromethane	90		60-140
chlorobenzene-d5	74		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1403217

Project Number: 12201 **Report Date:** 02/18/14

Method Blank Analysis
Batch Quality Control

Analytical Method: 48,TO-15-SIM
Analytical Date: 02/14/14 15:47

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab for sample(s): 01-05 Batch: WG670541-4								
Dichlorodifluoromethane	ND	0.050	--	ND	0.247	--		1
Chloromethane	ND	0.500	--	ND	1.03	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Trichlorofluoromethane	ND	0.050	--	ND	0.281	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	ND	1.00	--	ND	3.47	--		1
Freon-113	ND	0.050	--	ND	0.383	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Chloroform	ND	0.020	--	ND	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	ND	0.100	--	ND	0.319	--		1
Carbon tetrachloride	ND	0.020	--	ND	0.126	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1403217

Project Number: 12201 **Report Date:** 02/18/14

Method Blank Analysis
Batch Quality Control

Analytical Method: 48,TO-15-SIM
Analytical Date: 02/14/14 15:47

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab for sample(s): 01-05 Batch: WG670541-4								
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	ND	0.050	--	ND	0.188	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Ethylbenzene	ND	0.020	--	ND	0.087	--		1
p/m-Xylene	ND	0.040	--	ND	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	ND	0.020	--	ND	0.087	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,2,4-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1403217

Project Number: 12201 **Report Date:** 02/18/14

Method Blank Analysis
Batch Quality Control

Analytical Method: 48,TO-15
Analytical Date: 02/14/14 15:47

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab for sample(s): 01-05 Batch: WG670549-4								
Propylene	ND	0.500	--	ND	0.861	--		1
Ethanol	ND	2.50	--	ND	4.71	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	ND	0.200	--	ND	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1

	Results	Qualifier	Units	RDL	Dilution Factor
Tentatively Identified Compounds					

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1403217
Report Date: 02/18/14

Method Blank Analysis
Batch Quality Control

Analytical Method: 48,TO-15
Analytical Date: 02/14/14 15:47

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab for sample(s): 01-05 Batch: WG670549-4								

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1403217

Report Date: 02/18/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-05 Batch: WG670541-3								
Dichlorodifluoromethane	88		-		70-130	-		25
Chloromethane	107		-		70-130	-		25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	106		-		70-130	-		25
Vinyl chloride	104		-		70-130	-		25
1,3-Butadiene	106		-		70-130	-		25
Bromomethane	106		-		70-130	-		25
Chloroethane	97		-		70-130	-		25
Acetone	127		-		70-130	-		25
Trichlorofluoromethane	121		-		70-130	-		25
Acrylonitrile	99		-		70-130	-		25
1,1-Dichloroethene	101		-		70-130	-		25
Methylene chloride	115		-		70-130	-		25
1,1,2-Trichloro-1,2,2-Trifluoroethane	110		-		70-130	-		25
Halothane	112		-		70-130	-		25
trans-1,2-Dichloroethene	92		-		70-130	-		25
1,1-Dichloroethane	106		-		70-130	-		25
Methyl tert butyl ether	98		-		70-130	-		25
2-Butanone	88		-		70-130	-		25
cis-1,2-Dichloroethene	111		-		70-130	-		25
Chloroform	106		-		70-130	-		25
1,2-Dichloroethane	111		-		70-130	-		25

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1403217

Report Date: 02/18/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-05 Batch: WG670541-3								
1,1,1-Trichloroethane	108		-		70-130	-		25
Benzene	79		-		70-130	-		25
Carbon tetrachloride	116		-		70-130	-		25
1,2-Dichloropropane	100		-		70-130	-		25
Bromodichloromethane	105		-		70-130	-		25
1,4-Dioxane	89		-		70-130	-		25
Trichloroethene	85		-		70-130	-		25
cis-1,3-Dichloropropene	102		-		70-130	-		25
4-Methyl-2-pentanone	98		-		70-130	-		25
trans-1,3-Dichloropropene	91		-		70-130	-		25
1,1,2-Trichloroethane	117		-		70-130	-		25
Toluene	87		-		70-130	-		25
Dibromochloromethane	99		-		70-130	-		25
1,2-Dibromoethane	101		-		70-130	-		25
Tetrachloroethene	95		-		70-130	-		25
1,1,1,2-Tetrachloroethane	96		-		70-130	-		25
Chlorobenzene	94		-		70-130	-		25
Ethylbenzene	93		-		70-130	-		25
p/m-Xylene	95		-		70-130	-		25
Bromoform	100		-		70-130	-		25
Styrene	94		-		70-130	-		25

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1403217

Report Date: 02/18/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-05 Batch: WG670541-3								
1,1,2,2-Tetrachloroethane	107		-		70-130	-		25
o-Xylene	95		-		70-130	-		25
Isopropylbenzene	89		-		70-130	-		25
4-Ethyltoluene	83		-		70-130	-		25
1,3,5-Trimethylbenzene	96		-		70-130	-		25
1,2,4-Trimethylbenzene	100		-		70-130	-		25
1,3-Dichlorobenzene	102		-		70-130	-		25
1,4-Dichlorobenzene	100		-		70-130	-		25
sec-Butylbenzene	89		-		70-130	-		25
p-Isopropyltoluene	85		-		70-130	-		25
1,2-Dichlorobenzene	102		-		70-130	-		25
n-Butylbenzene	94		-		70-130	-		25
1,2,4-Trichlorobenzene	109		-		70-130	-		25
Naphthalene	98		-		70-130	-		25
1,2,3-Trichlorobenzene	99		-		70-130	-		25
Hexachlorobutadiene	106		-		70-130	-		25

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1403217

Report Date: 02/18/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-05 Batch: WG670549-3								
Chlorodifluoromethane	82		-		70-130	-		
Propylene	92		-		70-130	-		
Propane	73		-		70-130	-		
Dichlorodifluoromethane	84		-		70-130	-		
Chloromethane	87		-		70-130	-		
1,2-Dichloro-1,1,2,2-tetrafluoroethane	93		-		70-130	-		
Methanol	73		-		70-130	-		
Vinyl chloride	85		-		70-130	-		
1,3-Butadiene	83		-		70-130	-		
Butane	81		-		70-130	-		
Bromomethane	80		-		70-130	-		
Chloroethane	82		-		70-130	-		
Ethyl Alcohol	79		-		70-130	-		
Dichlorofluoromethane	81		-		70-130	-		
Vinyl bromide	79		-		70-130	-		
Acrolein	73		-		70-130	-		
Acetone	109		-		70-130	-		
Acetonitrile	79		-		70-130	-		
Trichlorofluoromethane	99		-		70-130	-		
iso-Propyl Alcohol	83		-		70-130	-		
Acrylonitrile	74		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1403217

Report Date: 02/18/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-05 Batch: WG670549-3								
Pentane	79		-		70-130	-		
Ethyl ether	77		-		70-130	-		
1,1-Dichloroethene	84		-		70-130	-		
tert-Butyl Alcohol	79		-		70-130	-		
Methylene chloride	93		-		70-130	-		
3-Chloropropene	87		-		70-130	-		
Carbon disulfide	72		-		70-130	-		
1,1,2-Trichloro-1,2,2-Trifluoroethane	89		-		70-130	-		
trans-1,2-Dichloroethene	76		-		70-130	-		
1,1-Dichloroethane	82		-		70-130	-		
Methyl tert butyl ether	78		-		70-130	-		
Vinyl acetate	**133**	Q	-		70-130	-		
2-Butanone	86		-		70-130	-		
cis-1,2-Dichloroethene	98		-		70-130	-		
Ethyl Acetate	79		-		70-130	-		
Chloroform	90		-		70-130	-		
Tetrahydrofuran	78		-		70-130	-		
2,2-Dichloropropane	76		-		70-130	-		
1,2-Dichloroethane	94		-		70-130	-		
n-Hexane	88		-		70-130	-		
Isopropyl Ether	82		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1403217

Report Date: 02/18/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-05 Batch: WG670549-3								
Ethyl-Tert-Butyl-Ether	84		-		70-130	-		
1,1,1-Trichloroethane	103		-		70-130	-		
1,1-Dichloropropene	90		-		70-130	-		
Benzene	86		-		70-130	-		
Carbon tetrachloride	111		-		70-130	-		
Cyclohexane	87		-		70-130	-		
Tertiary-Amyl Methyl Ether	80		-		70-130	-		
Dibromomethane	86		-		70-130	-		
1,2-Dichloropropane	95		-		70-130	-		
Bromodichloromethane	96		-		70-130	-		
1,4-Dioxane	84		-		70-130	-		
Trichloroethene	79		-		70-130	-		
2,2,4-Trimethylpentane	88		-		70-130	-		
Methyl methacrylate	100		-		70-130	-		
Heptane	92		-		70-130	-		
cis-1,3-Dichloropropene	98		-		70-130	-		
4-Methyl-2-pentanone	95		-		70-130	-		
trans-1,3-Dichloropropene	87		-		70-130	-		
1,1,2-Trichloroethane	105		-		70-130	-		
Toluene	83		-		70-130	-		
1,3-Dichloropropane	78		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1403217

Report Date: 02/18/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-05 Batch: WG670549-3								
2-Hexanone	91		-		70-130	-		
Dibromochloromethane	92		-		70-130	-		
1,2-Dibromoethane	94		-		70-130	-		
Butyl Acetate	75		-		70-130	-		
Octane	74		-		70-130	-		
Tetrachloroethene	87		-		70-130	-		
1,1,1,2-Tetrachloroethane	90		-		70-130	-		
Chlorobenzene	88		-		70-130	-		
Ethylbenzene	88		-		70-130	-		
p/m-Xylene	88		-		70-130	-		
Bromoform	90		-		70-130	-		
Styrene	86		-		70-130	-		
1,1,2,2-Tetrachloroethane	107		-		70-130	-		
o-Xylene	90		-		70-130	-		
1,2,3-Trichloropropane	88		-		70-130	-		
Nonane (C9)	85		-		70-130	-		
Isopropylbenzene	84		-		70-130	-		
Bromobenzene	80		-		70-130	-		
o-Chlorotoluene	82		-		70-130	-		
n-Propylbenzene	81		-		70-130	-		
p-Chlorotoluene	80		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1403217

Report Date: 02/18/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-05 Batch: WG670549-3								
4-Ethyltoluene	76		-		70-130	-		
1,3,5-Trimethylbenzene	89		-		70-130	-		
tert-Butylbenzene	84		-		70-130	-		
1,2,4-Trimethylbenzene	93		-		70-130	-		
Decane (C10)	82		-		70-130	-		
Benzyl chloride	71		-		70-130	-		
1,3-Dichlorobenzene	93		-		70-130	-		
1,4-Dichlorobenzene	90		-		70-130	-		
sec-Butylbenzene	83		-		70-130	-		
p-Isopropyltoluene	77		-		70-130	-		
1,2-Dichlorobenzene	92		-		70-130	-		
n-Butylbenzene	86		-		70-130	-		
1,2-Dibromo-3-chloropropane	88		-		70-130	-		
Undecane	89		-		70-130	-		
Dodecane (C12)	98		-		70-130	-		
1,2,4-Trichlorobenzene	97		-		70-130	-		
Naphthalene	86		-		70-130	-		
1,2,3-Trichlorobenzene	88		-		70-130	-		
Hexachlorobutadiene	99		-		70-130	-		

Lab Duplicate Analysis
Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1403217
Report Date: 02/18/14

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-05 QC Batch ID: WG670541-5 QC Sample: L1403217-05 Client ID: S-157-J.2						
Dichlorodifluoromethane	0.337	0.350	ppbV	4		25
Chloromethane	0.539	0.537	ppbV	0		25
Freon-114	ND	ND	ppbV	NC		25
Vinyl chloride	ND	ND	ppbV	NC		25
1,3-Butadiene	0.052	0.050	ppbV	4		25
Bromomethane	ND	ND	ppbV	NC		25
Chloroethane	ND	ND	ppbV	NC		25
Trichlorofluoromethane	0.265	0.260	ppbV	2		25
1,1-Dichloroethene	ND	ND	ppbV	NC		25
Methylene chloride	ND	ND	ppbV	NC		25
Freon-113	0.072	0.069	ppbV	4		25
trans-1,2-Dichloroethene	ND	ND	ppbV	NC		25
1,1-Dichloroethane	ND	ND	ppbV	NC		25
Methyl tert butyl ether	ND	ND	ppbV	NC		25
cis-1,2-Dichloroethene	0.024	0.025	ppbV	4		25
Chloroform	0.057	0.057	ppbV	0		25
1,2-Dichloroethane	ND	ND	ppbV	NC		25
1,1,1-Trichloroethane	ND	ND	ppbV	NC		25
Benzene	0.291	0.286	ppbV	2		25

Lab Duplicate Analysis
Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1403217
Report Date: 02/18/14

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-05 QC Batch ID: WG670541-5 QC Sample: L1403217-05 Client ID: S-157-J.2					
Carbon tetrachloride	0.102	0.099	ppbV	3	25
1,2-Dichloropropane	ND	ND	ppbV	NC	25
Bromodichloromethane	ND	ND	ppbV	NC	25
Trichloroethene	ND	0.020	ppbV	NC	25
cis-1,3-Dichloropropene	ND	ND	ppbV	NC	25
trans-1,3-Dichloropropene	ND	ND	ppbV	NC	25
1,1,2-Trichloroethane	ND	ND	ppbV	NC	25
Toluene	1.48	1.62	ppbV	9	25
Dibromochloromethane	ND	ND	ppbV	NC	25
1,2-Dibromoethane	ND	ND	ppbV	NC	25
Tetrachloroethene	0.032	0.036	ppbV	12	25
1,1,1,2-Tetrachloroethane	ND	ND	ppbV	NC	25
Chlorobenzene	ND	ND	ppbV	NC	25
Ethylbenzene	0.356	0.395	ppbV	10	25
p/m-Xylene	1.48	1.63	ppbV	10	25
Bromoform	ND	ND	ppbV	NC	25
Styrene	0.061	0.067	ppbV	9	25
1,1,2,2-Tetrachloroethane	ND	ND	ppbV	NC	25
o-Xylene	0.726	0.780	ppbV	7	25

Lab Duplicate Analysis
Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1403217
Report Date: 02/18/14

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-05 QC Batch ID: WG670541-5 QC Sample: L1403217-05 Client ID: S-157-J.2					
1,3,5-Trimethybenzene	1.36	1.48	ppbV	8	25
1,2,4-Trimethylbenzene	4.66	5.10	ppbV	9	25
1,3-Dichlorobenzene	ND	ND	ppbV	NC	25
1,4-Dichlorobenzene	ND	ND	ppbV	NC	25
1,2-Dichlorobenzene	ND	ND	ppbV	NC	25
1,2,4-Trichlorobenzene	ND	ND	ppbV	NC	25
Naphthalene	ND	0.050	ppbV	NC	25
Hexachlorobutadiene	ND	ND	ppbV	NC	25

Lab Duplicate Analysis
Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1403217
Report Date: 02/18/14

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-05 QC Batch ID: WG670549-6 QC Sample: L1403217-05 Client ID: S-157-J.2					
Propylene	ND	ND	ppbV	NC	25
Ethanol	117	115	ppbV	2	25
Vinyl bromide	ND	ND	ppbV	NC	25
Acetone	18.2	17.7	ppbV	3	25
Isopropanol	89.0	87.3	ppbV	2	25
3-Chloropropene	ND	ND	ppbV	NC	25
Carbon disulfide	ND	ND	ppbV	NC	25
Vinyl acetate	ND	ND	ppbV	NC	25
2-Butanone	2.04	2.05	ppbV	0	25
Ethyl Acetate	ND	ND	ppbV	NC	25
Tetrahydrofuran	ND	ND	ppbV	NC	25
n-Hexane	1.68	1.70	ppbV	1	25
Cyclohexane	2.06	2.07	ppbV	0	25
1,4-Dioxane	ND	ND	ppbV	NC	25
2,2,4-Trimethylpentane	ND	ND	ppbV	NC	25
Heptane	0.415	0.399	ppbV	4	25
4-Methyl-2-pentanone	ND	ND	ppbV	NC	25
2-Hexanone	ND	ND	ppbV	NC	25
4-Ethyltoluene	1.25	1.22	ppbV	2	25

Lab Duplicate Analysis
Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1403217
Report Date: 02/18/14

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-05 QC Batch ID: WG670549-6 QC Sample: L1403217-05 Client ID: S-157-J.2					
Benzyl chloride	ND	ND	ppbV	NC	25

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1403217

Project Number: 12201 **Report Date:** 02/18/14

SAMPLE RESULTS

Lab ID:	L1403217-01	Date Collected:	02/08/14 16:03
Client ID:	WPD	Date Received:	02/11/14
Sample Location:	BEVERLY, MA	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	02/14/14 19:30		
Analyst:	AR		

Quality Control Information

Sample Type:	24 Hour Composite
Sample Container Type:	Canister - 6 Liter
Sampling Flow Controller:	Mechanical
Sampling Zone:	Unknown
Sampling Flow Meter RPD of pre & post-sampling calibration check:	29%
Were all QA/QC procedures REQUIRED by the method followed?	Yes
Were all performance/acceptance standards for the required procedures achieved?	Yes
Were significant modifications made to the method as specified in Sect 11.1.2?	No

Petroleum Hydrocarbons in Air - Mansfield Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	ND		ug/m3	12	--	1
Toluene	ND		ug/m3	2.0	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	ND		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	64		50-200
Bromochloromethane	67		50-200
Chlorobenzene-d5	77		50-200

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1403217

Project Number: 12201 **Report Date:** 02/18/14

SAMPLE RESULTS

Lab ID:	L1403217-02	Date Collected:	02/08/14 16:14
Client ID:	S-157-J	Date Received:	02/11/14
Sample Location:	BEVERLY, MA	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	02/15/14 07:40		
Analyst:	AR		

Quality Control Information

Sample Type:	24 Hour Composite
Sample Container Type:	Canister - 6 Liter
Sampling Flow Controller:	Mechanical
Sampling Zone:	Unknown
Sampling Flow Meter RPD of pre & post-sampling calibration check:	<=20%
Were all QA/QC procedures REQUIRED by the method followed?	Yes
Were all performance/acceptance standards for the required procedures achieved?	Yes
Were significant modifications made to the method as specified in Sect 11.1.2?	No

Petroleum Hydrocarbons in Air - Mansfield Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	66		ug/m3	12	--	1
Toluene	2.9		ug/m3	2.0	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	5.0		ug/m3	4.0	--	1
o-Xylene	2.4		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	230		ug/m3	14	--	1
C9-C10 Aromatics Total	61		ug/m3	10	--	1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	68		50-200
Bromochloromethane	74		50-200
Chlorobenzene-d5	70		50-200

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1403217

Project Number: 12201 **Report Date:** 02/18/14

SAMPLE RESULTS

Lab ID:	L1403217-03	Date Collected:	02/08/14 16:15
Client ID:	DUP	Date Received:	02/11/14
Sample Location:	BEVERLY, MA	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	02/15/14 06:36		
Analyst:	AR		

Quality Control Information

Sample Type:	24 Hour Composite
Sample Container Type:	Canister - 6 Liter
Sampling Flow Controller:	Mechanical
Sampling Zone:	Unknown
Sampling Flow Meter RPD of pre & post-sampling calibration check:	<=20%
Were all QA/QC procedures REQUIRED by the method followed?	Yes
Were all performance/acceptance standards for the required procedures achieved?	Yes
Were significant modifications made to the method as specified in Sect 11.1.2?	No

Petroleum Hydrocarbons in Air - Mansfield Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	53		ug/m3	12	--	1
Toluene	2.6		ug/m3	2.0	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	5.7		ug/m3	4.0	--	1
o-Xylene	3.0		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	270		ug/m3	14	--	1
C9-C10 Aromatics Total	72		ug/m3	10	--	1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	66		50-200
Bromochloromethane	64		50-200
Chlorobenzene-d5	73		50-200

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1403217

Project Number: 12201 **Report Date:** 02/18/14

SAMPLE RESULTS

Lab ID:	L1403217-04	Date Collected:	02/08/14 16:16
Client ID:	S-157-J.1	Date Received:	02/11/14
Sample Location:	BEVERLY, MA	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	02/15/14 07:08		
Analyst:	AR		

Quality Control Information

Sample Type:	24 Hour Composite
Sample Container Type:	Canister - 6 Liter
Sampling Flow Controller:	Mechanical
Sampling Zone:	Unknown
Sampling Flow Meter RPD of pre & post-sampling calibration check:	<=20%
Were all QA/QC procedures REQUIRED by the method followed?	Yes
Were all performance/acceptance standards for the required procedures achieved?	Yes
Were significant modifications made to the method as specified in Sect 11.1.2?	No

Petroleum Hydrocarbons in Air - Mansfield Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	58		ug/m3	12	--	1
Toluene	4.7		ug/m3	2.0	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	6.5		ug/m3	4.0	--	1
o-Xylene	3.2		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	270		ug/m3	14	--	1
C9-C10 Aromatics Total	71		ug/m3	10	--	1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	64		50-200
Bromochloromethane	62		50-200
Chlorobenzene-d5	67		50-200

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1403217

Project Number: 12201 **Report Date:** 02/18/14

SAMPLE RESULTS

Lab ID:	L1403217-05	Date Collected:	02/08/14 16:17
Client ID:	S-157-J.2	Date Received:	02/11/14
Sample Location:	BEVERLY, MA	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	02/14/14 21:38		
Analyst:	AR		

Quality Control Information

Sample Type:	24 Hour Composite
Sample Container Type:	Canister - 6 Liter
Sampling Flow Controller:	Mechanical
Sampling Zone:	Unknown
Sampling Flow Meter RPD of pre & post-sampling calibration check:	<=20%
Were all QA/QC procedures REQUIRED by the method followed?	Yes
Were all performance/acceptance standards for the required procedures achieved?	Yes
Were significant modifications made to the method as specified in Sect 11.1.2?	No

Petroleum Hydrocarbons in Air - Mansfield Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	55		ug/m3	12	--	1
Toluene	5.8		ug/m3	2.0	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	6.6		ug/m3	4.0	--	1
o-Xylene	3.1		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	270		ug/m3	14	--	1
C9-C10 Aromatics Total	74		ug/m3	10	--	1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	63		50-200
Bromochloromethane	68		50-200
Chlorobenzene-d5	68		50-200

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1403217

Project Number: 12201 **Report Date:** 02/18/14

Method Blank Analysis
Batch Quality Control

Analytical Method: 96,APH
Analytical Date: 02/14/14 15:47
Analyst: AR

Parameter	Result	Qualifier	Units	RL	MDL
Petroleum Hydrocarbons in Air - Mansfield Lab for sample(s): 01-05 Batch: WG670533-4					
1,3-Butadiene	ND		ug/m3	2.0	--
Methyl tert butyl ether	ND		ug/m3	2.0	--
Benzene	ND		ug/m3	2.0	--
C5-C8 Aliphatics, Adjusted	ND		ug/m3	12	--
Toluene	ND		ug/m3	2.0	--
Ethylbenzene	ND		ug/m3	2.0	--
p/m-Xylene	ND		ug/m3	4.0	--
o-Xylene	ND		ug/m3	2.0	--
Naphthalene	ND		ug/m3	2.0	--
C9-C12 Aliphatics, Adjusted	ND		ug/m3	14	--
C9-C10 Aromatics Total	ND		ug/m3	10	--

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1403217

Report Date: 02/18/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Petroleum Hydrocarbons in Air - Mansfield Lab Associated sample(s): 01-05 Batch: WG670533-3								
1,3-Butadiene	81		-		70-130	-		
Methyl tert butyl ether	80		-		70-130	-		
Benzene	85		-		70-130	-		
C5-C8 Aliphatics, Adjusted	87		-		70-130	-		
Toluene	86		-		70-130	-		
Ethylbenzene	90		-		70-130	-		
p/m-Xylene	90		-		70-130	-		
o-Xylene	91		-		70-130	-		
Naphthalene	112		-		50-150	-		
C9-C12 Aliphatics, Adjusted	97		-		70-130	-		
C9-C10 Aromatics Total	81		-		70-130	-		

Lab Duplicate Analysis
Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1403217
Report Date: 02/18/14

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Petroleum Hydrocarbons in Air - Mansfield Lab Associated sample(s): 01-05 QC Batch ID: WG670533-5 QC Sample: L1403217-05 Client ID: S-157-J.2						
1,3-Butadiene	ND	ND	ug/m3	NC		30
Methyl tert butyl ether	ND	ND	ug/m3	NC		30
Benzene	ND	ND	ug/m3	NC		30
C5-C8 Aliphatics, Adjusted	55	55	ug/m3	0		30
Toluene	5.8	5.9	ug/m3	2		30
Ethylbenzene	ND	ND	ug/m3	NC		30
p/m-Xylene	6.6	6.7	ug/m3	2		30
o-Xylene	3.1	3.4	ug/m3	9		30
Naphthalene	ND	ND	ug/m3	NC		30
C9-C12 Aliphatics, Adjusted	270	290	ug/m3	7		30
C9-C10 Aromatics Total	74	78	ug/m3	5		30

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Lab Number: L1403217

Project Number: 12201

Report Date: 02/18/14

Canister and Flow Controller Information

Samplenum	Client ID	Media ID	Media Type	Date Prepared	Bottle Order	Cleaning Batch ID	Can Leak Check	Initial Pressure (in. Hg)	Pressure on Receipt (in. Hg)	Flow Controler Leak Chk	Flow Out mL/min	Flow In mL/min	% RPD
L1403217-01	WPD	0622	#16 AMB	02/05/14	98439		-	-	-	Pass	3.0	4.0	29
L1403217-01	WPD	611	6.0L Can	02/05/14	98439	L1402605-02	Pass	-29.5	2.4	-	-	-	-
L1403217-02	S-157-J	0263	#16 AMB	02/05/14	98439		-	-	-	Pass	3.0	3.1	3
L1403217-02	S-157-J	786	6.0L Can	02/05/14	98439	L1402605-02	Pass	-28.0	-7.0	-	-	-	-
L1403217-03	DUP	0011	#16 AMB	02/05/14	98439		-	-	-	Pass	3.0	3.2	6
L1403217-03	DUP	1564	6.0L Can	02/05/14	98439	L1402605-02	Pass	-30.0	-9.9	-	-	-	-
L1403217-04	S-157-J.1	0625	#16 AMB	02/05/14	98439		-	-	-	Pass	3.2	2.8	13
L1403217-04	S-157-J.1	1679	6.0L Can	02/05/14	98439	L1402605-02	Pass	-30.0	-15.4	-	-	-	-
L1403217-05	S-157-J.2	0624	#16 AMB	02/05/14	98439		-	-	-	Pass	3.0	3.2	6
L1403217-05	S-157-J.2	1539	6.0L Can	02/05/14	98439	L1402543-03	Pass	-29.5	-11.6	-	-	-	-

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1402543
Report Date: 02/18/14

Air Canister Certification Results

Lab ID: L1402543-03
Client ID: CAN 1808 SHELF 43
Sample Location:
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 01/31/14 19:36
Analyst: RY

Date Collected: 01/30/14 17:46
Date Received: 01/31/14
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Chlorodifluoromethane	ND	0.200	--	ND	0.707	--		1
Propylene	ND	0.500	--	ND	0.861	--		1
Propane	ND	0.500	--	ND	0.902	--		1
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Methanol	ND	5.00	--	ND	6.55	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Butane	ND	0.200	--	ND	0.475	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	ND	2.50	--	ND	4.71	--		1
Dichlorofluoromethane	ND	0.200	--	ND	0.842	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acrolein	ND	0.500	--	ND	1.15	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Acetonitrile	ND	0.200	--	ND	0.336	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
Acrylonitrile	ND	0.200	--	ND	0.434	--		1
Pentane	ND	0.200	--	ND	0.590	--		1
Ethyl ether	ND	0.200	--	ND	0.606	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L1402543
Report Date: 02/18/14

Air Canister Certification Results

Lab ID: L1402543-03
Client ID: CAN 1808 SHELF 43
Sample Location:

Date Collected: 01/30/14 17:46
Date Received: 01/31/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Methylene chloride	ND	1.00	--	ND	3.47	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	ND	0.200	--	ND	0.590	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
2,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Diisopropyl ether	ND	0.200	--	ND	0.836	--		1
tert-Butyl Ethyl Ether	ND	0.200	--	ND	0.836	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
1,1-Dichloropropene	ND	0.200	--	ND	0.908	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
tert-Amyl Methyl Ether	ND	0.200	--	ND	0.836	--		1
Dibromomethane	ND	0.200	--	ND	1.42	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1402543
Report Date: 02/18/14

Air Canister Certification Results

Lab ID: L1402543-03
Client ID: CAN 1808 SHELF 43
Sample Location:
Date Collected: 01/30/14 17:46
Date Received: 01/31/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Methyl Methacrylate	ND	0.500	--	ND	2.05	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
1,3-Dichloropropane	ND	0.200	--	ND	0.924	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Butyl acetate	ND	0.500	--	ND	2.38	--		1
Octane	ND	0.200	--	ND	0.934	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
1,1,1,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
1,2,3-Trichloropropane	ND	0.200	--	ND	1.21	--		1
Nonane	ND	0.200	--	ND	1.05	--		1
Isopropylbenzene	ND	0.200	--	ND	0.983	--		1
Bromobenzene	ND	0.200	--	ND	0.793	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L1402543
Report Date: 02/18/14

Air Canister Certification Results

Lab ID: L1402543-03
Client ID: CAN 1808 SHELF 43
Sample Location:

Date Collected: 01/30/14 17:46
Date Received: 01/31/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
2-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
n-Propylbenzene	ND	0.200	--	ND	0.983	--		1
4-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
tert-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Decane	ND	0.200	--	ND	1.16	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
sec-Butylbenzene	ND	0.200	--	ND	1.10	--		1
p-Isopropyltoluene	ND	0.200	--	ND	1.10	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
n-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2-Dibromo-3-chloropropane	ND	0.200	--	ND	1.93	--		1
Undecane	ND	0.200	--	ND	1.28	--		1
Dodecane	ND	0.200	--	ND	1.39	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Naphthalene	ND	0.200	--	ND	1.05	--		1
1,2,3-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

	Results	**Qualifier**	**Units**	**RDL**	**Dilution Factor**
Tentatively Identified Compounds					
No Tentatively Identified Compounds					

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1402543
Report Date: 02/18/14

Air Canister Certification Results

Lab ID: L1402543-03
Client ID: CAN 1808 SHELF 43
Sample Location:
Date Collected: 01/30/14 17:46
Date Received: 01/31/14
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	99		60-140
Bromochloromethane	98		60-140
chlorobenzene-d5	99		60-140

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1402543
Report Date: 02/18/14

Air Canister Certification Results

Lab ID: L1402543-03
Client ID: CAN 1808 SHELF 43
Sample Location:
Matrix: Air
Anaytical Method: 48,TO-15-SIM
Analytical Date: 01/31/14 19:36
Analyst: RY

Date Collected: 01/30/14 17:46
Date Received: 01/31/14
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab								
Dichlorodifluoromethane	ND	0.050	--	ND	0.247	--		1
Chloromethane	ND	0.500	--	ND	1.03	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Acetone	ND	2.00	--	ND	4.75	--		1
Trichlorofluoromethane	ND	0.050	--	ND	0.281	--		1
Acrylonitrile	ND	0.500	--	ND	1.09	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	ND	1.00	--	ND	3.47	--		1
Freon-113	ND	0.050	--	ND	0.383	--		1
Halothane	ND	0.050	--	ND	0.404	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Chloroform	ND	0.020	--	ND	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	ND	0.100	--	ND	0.319	--		1
Carbon tetrachloride	ND	0.020	--	ND	0.126	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L1402543
Report Date: 02/18/14

Air Canister Certification Results

Lab ID: L1402543-03
Client ID: CAN 1808 SHELF 43
Sample Location:

Date Collected: 01/30/14 17:46
Date Received: 01/31/14
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab								
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
1,4-Dioxane	ND	0.100	--	ND	0.360	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	ND	0.050	--	ND	0.188	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Ethylbenzene	ND	0.020	--	ND	0.087	--		1
p/m-Xylene	ND	0.040	--	ND	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	ND	0.020	--	ND	0.087	--		1
Isopropylbenzene	ND	0.500	--	ND	2.46	--		1
4-Ethyltoluene	ND	0.020	--	ND	0.098	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,2,4-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
sec-Butylbenzene	ND	0.500	--	ND	2.74	--		1
p-Isopropyltoluene	ND	0.500	--	ND	2.74	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1402543
Report Date: 02/18/14

Air Canister Certification Results

Lab ID: L1402543-03
Client ID: CAN 1808 SHELF 43
Sample Location:
Date Collected: 01/30/14 17:46
Date Received: 01/31/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
n-Butylbenzene	ND	0.500	--	ND	2.74	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
1,2,3-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-difluorobenzene	100		60-140
bromochloromethane	101		60-140
chlorobenzene-d5	99		60-140

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1402605
Report Date: 02/18/14

Air Canister Certification Results

Lab ID: L1402605-02
Client ID: CAN 1576 SHELF 47
Sample Location:
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 01/31/14 21:11
Analyst: RY

Date Collected: 01/31/14 11:55
Date Received: 01/31/14
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Chlorodifluoromethane	ND	0.200	--	ND	0.707	--		1
Propylene	ND	0.500	--	ND	0.861	--		1
Propane	ND	0.500	--	ND	0.902	--		1
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Methanol	ND	5.00	--	ND	6.55	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Butane	ND	0.200	--	ND	0.475	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	ND	2.50	--	ND	4.71	--		1
Dichlorofluoromethane	ND	0.200	--	ND	0.842	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acrolein	ND	0.500	--	ND	1.15	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Acetonitrile	ND	0.200	--	ND	0.336	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
Acrylonitrile	ND	0.200	--	ND	0.434	--		1
Pentane	ND	0.200	--	ND	0.590	--		1
Ethyl ether	ND	0.200	--	ND	0.606	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1402605
Report Date: 02/18/14

Air Canister Certification Results

Lab ID: L1402605-02
Client ID: CAN 1576 SHELF 47
Sample Location:
Date Collected: 01/31/14 11:55
Date Received: 01/31/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Methylene chloride	ND	1.00	--	ND	3.47	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	ND	0.200	--	ND	0.590	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
2,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Diisopropyl ether	ND	0.200	--	ND	0.836	--		1
tert-Butyl Ethyl Ether	ND	0.200	--	ND	0.836	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
1,1-Dichloropropene	ND	0.200	--	ND	0.908	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
tert-Amyl Methyl Ether	ND	0.200	--	ND	0.836	--		1
Dibromomethane	ND	0.200	--	ND	1.42	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1402605
Report Date: 02/18/14

Air Canister Certification Results

Lab ID: L1402605-02
Client ID: CAN 1576 SHELF 47
Sample Location:
Date Collected: 01/31/14 11:55
Date Received: 01/31/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Methyl Methacrylate	ND	0.500	--	ND	2.05	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
1,3-Dichloropropane	ND	0.200	--	ND	0.924	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Butyl acetate	ND	0.500	--	ND	2.38	--		1
Octane	ND	0.200	--	ND	0.934	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
1,1,1,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
1,2,3-Trichloropropane	ND	0.200	--	ND	1.21	--		1
Nonane	ND	0.200	--	ND	1.05	--		1
Isopropylbenzene	ND	0.200	--	ND	0.983	--		1
Bromobenzene	ND	0.200	--	ND	0.793	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L1402605
Report Date: 02/18/14

Air Canister Certification Results

Lab ID: L1402605-02
Client ID: CAN 1576 SHELF 47
Sample Location:

Date Collected: 01/31/14 11:55
Date Received: 01/31/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
2-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
n-Propylbenzene	ND	0.200	--	ND	0.983	--		1
4-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
tert-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Decane	ND	0.200	--	ND	1.16	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
sec-Butylbenzene	ND	0.200	--	ND	1.10	--		1
p-Isopropyltoluene	ND	0.200	--	ND	1.10	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
n-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2-Dibromo-3-chloropropane	ND	0.200	--	ND	1.93	--		1
Undecane	ND	0.200	--	ND	1.28	--		1
Dodecane	ND	0.200	--	ND	1.39	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Naphthalene	ND	0.200	--	ND	1.05	--		1
1,2,3-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

	Results	**Qualifier**	**Units**	**RDL**	**Dilution Factor**
Tentatively Identified Compounds					

No Tentatively Identified Compounds

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1402605
Report Date: 02/18/14

Air Canister Certification Results

Lab ID: L1402605-02
Client ID: CAN 1576 SHELF 47
Sample Location:
Date Collected: 01/31/14 11:55
Date Received: 01/31/14
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	93		60-140
Bromochloromethane	92		60-140
chlorobenzene-d5	94		60-140

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1402605
Report Date: 02/18/14

Air Canister Certification Results

Lab ID: L1402605-02
Client ID: CAN 1576 SHELF 47
Sample Location:
Matrix: Air
Anaytical Method: 48,TO-15-SIM
Analytical Date: 01/31/14 21:11
Analyst: RY

Date Collected: 01/31/14 11:55
Date Received: 01/31/14
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab								
Dichlorodifluoromethane	ND	0.050	--	ND	0.247	--		1
Chloromethane	ND	0.500	--	ND	1.03	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Acetone	ND	2.00	--	ND	4.75	--		1
Trichlorofluoromethane	ND	0.050	--	ND	0.281	--		1
Acrylonitrile	ND	0.500	--	ND	1.09	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	ND	1.00	--	ND	3.47	--		1
Freon-113	ND	0.050	--	ND	0.383	--		1
Halothane	ND	0.050	--	ND	0.404	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Chloroform	ND	0.020	--	ND	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	ND	0.100	--	ND	0.319	--		1
Carbon tetrachloride	ND	0.020	--	ND	0.126	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1402605
Report Date: 02/18/14

Air Canister Certification Results

Lab ID: L1402605-02
Client ID: CAN 1576 SHELF 47
Sample Location:
Date Collected: 01/31/14 11:55
Date Received: 01/31/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
1,4-Dioxane	ND	0.100	--	ND	0.360	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	ND	0.050	--	ND	0.188	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Ethylbenzene	ND	0.020	--	ND	0.087	--		1
p/m-Xylene	ND	0.040	--	ND	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	ND	0.020	--	ND	0.087	--		1
Isopropylbenzene	ND	0.500	--	ND	2.46	--		1
4-Ethyltoluene	ND	0.020	--	ND	0.098	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,2,4-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
sec-Butylbenzene	ND	0.500	--	ND	2.74	--		1
p-Isopropyltoluene	ND	0.500	--	ND	2.74	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1402605
Report Date: 02/18/14

Air Canister Certification Results

Lab ID: L1402605-02
Client ID: CAN 1576 SHELF 47
Sample Location:
Date Collected: 01/31/14 11:55
Date Received: 01/31/14
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
n-Butylbenzene	ND	0.500	--	ND	2.74	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
1,2,3-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-difluorobenzene	94		60-140
bromochloromethane	94		60-140
chlorobenzene-d5	93		60-140

AIR Petro Can Certification

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1402543

Project Number: CANISTER QC BAT **Report Date:** 02/18/14

AIR CAN CERTIFICATION RESULTS

Lab ID:	L1402543-03	Date Collected:	01/30/14 17:46
Client ID:	CAN 1808 SHELF 43	Date Received:	01/31/14
Sample Location:	Not Specified	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	01/31/14 19:36		
Analyst:	RY		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Petroleum Hydrocarbons in Air - Mansfield Lab						
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	ND		ug/m3	12	--	1
Toluene	ND		ug/m3	2.0	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	ND		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1402605

Project Number: CANISTER QC BAT **Report Date:** 02/18/14

AIR CAN CERTIFICATION RESULTS

Lab ID:	L1402605-02	Date Collected:	01/31/14 11:55
Client ID:	CAN 1576 SHELF 47	Date Received:	01/31/14
Sample Location:	Not Specified	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	01/31/14 21:11		
Analyst:	RY		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Petroleum Hydrocarbons in Air - Mansfield Lab						
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	ND		ug/m3	12	--	1
Toluene	ND		ug/m3	2.0	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	ND		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1403217
Report Date: 02/18/14

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Reagent H2O Preserved Vials Frozen on: NA

Cooler Information **Custody Seal**
Cooler
N/A Present/Intact

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1403217-01A	Canister - 6 Liter	N/A	N/A		Y	Present/Intact	APH-10(30),TO15-LL(30),TO15-SIM(30)
L1403217-02A	Canister - 6 Liter	N/A	N/A		Y	Present/Intact	APH-10(30),TO15-LL(30),TO15-SIM(30)
L1403217-03A	Canister - 6 Liter	N/A	N/A		Y	Present/Intact	APH-10(30),TO15-LL(30),TO15-SIM(30)
L1403217-04A	Canister - 6 Liter	N/A	N/A		Y	Present/Intact	APH-10(30),TO15-LL(30),TO15-SIM(30)
L1403217-05A	Canister - 6 Liter	N/A	N/A		Y	Present/Intact	APH-10(30),TO15-LL(30),TO15-SIM(30)

*Values in parentheses indicate holding time in days

Project Name:	CUMMINGS BEVERLY AIR SAMPLING	**Lab Number:**	L1403217
Project Number:	12201	**Report Date:**	02/18/14

GLOSSARY

Acronyms

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NI - Not Ignitable.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit.

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

Report Format: Data Usability Report

Project Name:	CUMMINGS BEVERLY AIR SAMPLING	**Lab Number:**	L1403217
Project Number:	12201	**Report Date:**	02/18/14

Data Qualifiers

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report

Project Name:	CUMMINGS BEVERLY AIR SAMPLING	**Lab Number:**	L1403217
Project Number:	12201	**Report Date:**	02/18/14

REFERENCES

48 Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air. Second Edition. EPA/625/R-96/010b, January 1999.

96 Method for the Determination of Air-Phase Petroleum Hydrocarbons (APH), MassDEP, December 2009, Revision 1 with QC Requirements & Performance Standards for the Analysis of APH by GC/MS under the Massachusetts Contingency Plan, WSC-CAM-IXA, July 2010.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

Last revised December 11, 2013

The following analytes are not included in our NELAP Scope of Accreditation:

Westborough Facility
EPA 524.2: Acetone, 2-Butanone (Methyl ethyl ketone (MEK)), Tert-butyl alcohol, 2-Hexanone, Tetrahydrofuran, 1,3,5-Trichlorobenzene, 4-Methyl-2-pentanone (MIBK), Carbon disulfide, Diethyl ether.
EPA 8260C: 1,2,4,5-Tetramethylbenzene, 4-Ethyltoluene, Iodomethane (methyl iodide), Methyl methacrylate, Azobenzene.
EPA 8330A/B: PETN, Picric Acid, Nitroglycerine, 2,6-DANT, 2,4-DANT.
EPA 8270D: 1-Methylnaphthalene, Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 625: 4-Chloroaniline, 4-Methylphenol.
SM4500: Soil: Total Phosphorus, TKN, NO2, NO3.
EPA 9071: Total Petroleum Hydrocarbons, Oil & Grease.

Mansfield Facility
EPA 8270D: Biphenyl.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

The following analytes are included in our Massachusetts DEP Scope of Accreditation, Westborough Facility:

Drinking Water
EPA 200.8: Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl; **EPA 200.7**: Ba,Be,Ca,Cd,Cr,Cu,Na; **EPA 245.1:** Mercury;
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, Enterolert-QT.**

Non-Potable Water
EPA 200.8: Al,Sb,As,Be,Cd,Cr,Cu,Pb,Mn,Ni,Se,Ag,Tl,Zn;
EPA 200.7: Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn;
EPA 245.1, SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2340B, SM2320B, SM4500CL-E, SM4500F-BC, SM426C, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, SM4500P-B, E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9222D-MF**.

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

AIR ANALYSIS

ALPHA ANALYTICAL

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 2/11/14

ALPHA Job #: L1403217

320 Forbes Blvd, Mansfield, MA 02048
TEL: 508-822-9300 FAX: 508-822-3288

Client Information

Client: Geosphere Environmental Mgmt Inc
Address: 51 Portsmouth Ave
Exeter, NH 03833
Phone: 603-773-0075 x 12
Fax: 603-773-0077
Email: dniemeyer@geospherenh.com

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: Cummings Beverly Air Sampling
Project Location: Beverly, MA
Project #: 12201
Project Manager: David Niemeyer
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due: Time:

Report Information - Data Deliverables

☐ FAX
☐ ADEx
Criteria Checker:
(Default based on Regulatory Criteria Indicated)
Other Formats:
☒ EMAIL (standard pdf report)
☒ Additional Deliverables: Hard Copy in Mail
Report to: (if different than Project Manager)

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed	Program	Criteria

Other Project Specific Requirements/Comments: Run Entire TO-15 compound list - quantify per TO-15 SIM where applicable

All Columns Below Must Be Filled Out

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Start Time	End Time	Initial Vacuum	Final Vacuum	Sample Matrix*	Sampler's Initials	Can Size	I D Can	I D - Flow Controller	TO-14A by TO-15	TO-15	TO-15 SIM	APH	FIXED GASES	TO-13A	TO-4 / TO-10	Sample Comments (i.e. PID)
3217 -01	WPD	2/7/14-2/8/14	4:47pm	4:03pm	-29.83	-0.17	AA	DN	6L	611	622		X	X	X				
-02	S-157-J	2/7/14-2/8/14	5:35pm	4:14pm	-27.67	-8.85	AA	DN	6L	786	263		X	X	X				
-03	Dup	2/7/14-2/8/14	5:38pm	4:15pm	-30.66	-10.64	AA	DN	6L	1564	11	X	X	X					
-04	S-157-J.1	2/7/14-2/8/14	5:43pm	4:16pm	-30.30	-16.14	AA	DN	6L	1679	625	X	X	X					
-05	S-157-J.2	2/7/14-2/8/14	5:47pm	4:17pm	-30.04	-12.03	AA	DN	6L	1539	624		X	X	X				

*SAMPLE MATRIX CODES
AA = Ambient Air (Indoor/Outdoor)
SV = Soil Vapor/Landfill Gas/SVE
Other = Please Specify

Container Type			CS	CS	CS			

Relinquished By:	Date/Time	Received By:	Date/Time:
David Niemeyer (signature)	2/11/14 1:21PM	(signature)	2/11/14 13:21

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS.

Form No: 101-02 (10-Jun-09)

Appendix B

Data Validation Review Memorandum

GEOSPHERE
ENVIRONMENTAL MANAGEMENT INC.

Memorandum

To: **Bruce Hoskins**

From: **David Niemeyer**

Date: **April 11, 2014**

RE: **Data Validation Review: Air Samples: Cummings Center, Beverly, MA: Laboratory Report #L1403217**

SUMMARY

Limited validation was performed on the data for six air samples collected at Cummings Center in Beverly, MA. The samples were collected for a 24-hour period on February 7, 2014, and concluding on February 8, 2014. The samples were submitted to Alpha Analytical of Mansfield, MA for analysis. The samples were analyzed for volatile petroleum hydrocarbons (VOCs) using the EPA Methodology for TO-15 and TO-15 Selected Ion Monitoring (SIM) and air-phase petroleum hydrocarbons (APH) per Massachusetts Department of Environmental Protection (MassDEP) methodology per the Compendium of Analytical Methods (CAM).

In general, the data appear to be valid as reported and may be used for decision-making purposes. The analysis values of isopropyl alcohol in samples DUP (duplicate of S-157-J) and S-157-J.1 were estimated as the analysis for this compound was based on a re-analysis on dilution in order to quantitate the sample within the calibration range. Also, the relative percent difference (RPD) of the pre- and post-flow controller calibration check for sample WPD (measured at 29% RPD) was outside the acceptable limits (less than or equal to 20% RPD). These issues have a minor impact on the data usability.

SAMPLES

Samples included in this review are listed below:

WPD (Alpha ID Number L1403217-01)
S-157-J (Alpha ID Number L1403217-02)
Duplicate of S-149-J (Alpha ID Number L1403217-03)
S-157-J.1 (Alpha ID Number L1403217-04)
S-157-J.2 (Alpha ID Number L1403217-05)

51 PORTSMOUTH AVENUE, EXETER, NEW HAMPSHIRE 03833
Telephone: 603-773-0075 Fax: 603-773-0077
www.geospherenh.com

REVIEW ELEMENTS

Sample data were reviewed for the following parameters:

- Agreement of analyses conducted with GEOSPHERE requests
- Holding times and sample preservation
- Method blanks
- Laboratory control sample (LCS) results
- Field duplicate results
- Quantitation limits and sample results
- Air canister certification results

DISCUSSION

Agreement of Analyses Conducted with GEOSPHERE Requests

The sample report was checked to verify that the results corresponded to analytical requests as designated on the chain-of-custody and any other correspondence between GEOSPHERE and the laboratory. The requested analyses matched the analytical results received from the laboratory. There were no deviations from the requests on the chain-of-custody.

Holding Times and Sample Preservation

Samples were analyzed within the method-specific holding time. No sample preservation was required for this type of sampling.

Method Blanks

Target compounds were not detected in the methods blanks for either the TO-15 or APH analyses.

LCS Results

An LCS and LCS Duplicate were analyzed with the samples for both TO-15 and APH analyses. All LCS recoveries and RPDs were acceptable for both TO-15 and APH analyses with the exception of the TO-15 LCS recovery for vinyl acetate. The LCS recovery for vinyl acetate was 133%, which was slightly over the acceptance criteria of 70%-130%. This is not considered to be problematic as vinyl acetate was not detected in any of the samples.

Field Duplicate Results

Samples L1403217-02 and L1403217-03 were submitted as the field duplicate pair for this sample set and both represented location S-149-J. The field and duplicate sample were collected

using two canisters located next to each other. The following table summarizes the RPDs of the detected compounds.

Compound	L1403217-02 (µg/m^3)	L1403217-03 (µg/m^3)	RPD (%)
1,2,4-Trimethylbenzene	19.1	22.8	17.7
1,3,5-Trimethylbenzene	5.6	6.69	17.7
1,3-Butadiene	0.091	0.119	26.7
2-Butanone	4.39	6.1	32.6
4-Ethyltoluene	4.82	5.75	17.6
Acetone	32.8	44.9	31.1
Benzene	0.795	0.843	5.9
Carbon Tetrachloride	0.585	0.598	2.2
Chloroform	0.234	0.293	22.4
Chloromethane	1.05	1.23	15.8
Cis-1,2-dichloroethene	<0.079	0.099	N/A
Cyclohexane	5.51	6.82	21.2
Dichlorodifluoromethane	2.09	0.964	73.7
Ethanol	183	243	28.2
Ethylbenzene	1.21	1.4	14.6
Freon-113	0.491	0.628	24.5
Hexane	5.89	5.0	16.3
Isopropyl Alcohol	178	256	35.9
Methylene Chloride	39.6	<3.47	N/A
m/p- Xylenes	5.13	5.91	14.1
n-Heptane	1.19	1.42	17.6
Naphthalene	<0.262	0.267	N/A
o-Xylene	2.55	3.01	16.6
Propylene	<0.861	1.03	N/A
Styrene	0.179	0.213	17.3
Tetrachloroethene	0.183	0.176	3.9
Toluene	2.88	2.53	12.9
Trichlorofluoromethane	1.35	1.7	11.5
Toluene (APH)	2.9	2.6	10.9
m/p- Xylenes (APH)	5.0	5.7	13.1
o-Xylene (APH)	2.4	3.0	22.2
C_5-C_8 Aliphatics	66	53	21.8
C_9-C_{12} Aliphatics	230	270	16.0
C_9-C_{10} Aromatics	61	72	16.5

It should be noted that acceptable RPDs for field duplicates are less than 40% for compounds whose detected values are greater than five times the estimate quantitation limit (EQL); and for

compounds whose detected values are less than five times the EQL, value differences between the field sample and its associated duplicate are to be less than 2.5 times the EQL. Based on these criteria, the RPDs for the compounds listed above are acceptable except for dichlorodifluoromethane and methylene chloride. Of interesting note is the value of methylene chloride in sample L1403217-02, as this was the only sample with a detected concentration of methylene chloride. Due to the elevated numerical value of the sample analysis and the lack of detection in all other samples, laboratory contamination of methylene chloride within the processing/analysis of sample L1403217-02 is suspected.

Quantitation Limits and Sample Results

Samples DUP (duplicate of S-157-J [L1403217-03]) and S-157-J.1 (L1403217-04) were re-analyzed on dilution for isopropyl alcohol to quantitate the sample within the calibration range. The result for this parameter should be considered to be estimated and is noted in the analytical report with an "E" qualifier.

Air Canister Certification Results

Air canister certifications were performed using batch canister certifications for analyses of TO-15, TO-15 SIM, and APH. All certifications were acceptable as no compounds were detected and all internal standard recoveries were acceptable.